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CONTENTS

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A New Stage in the Struggle for the Cause of Great October [Unattributed; pp 3-8]	1
Protracted Nuclear War [G. Konev and V. Pokrovskiy; pp 9-14]	5
The AIDS Problem in the U.S. Armed Forces [A. Petrov; pp 15-18]	9
Iran's Ground Forces [A. Palov; pp 19-22]	13
Trends in the Development of Light Armored Vehicles [B. Safonov; pp 22-29]	15
Miles Laser Firing Simulator in U.S. Army Training [I. Aleksandrov; pp 29-31]	20
Tactical Aviation in Contemporary Operations [V. Kondratyev; pp 33-40]	22
Guidance Systems for Air-to-Air Guided Missiles [V. Sapkov; pp 40-45]	26
Operational Use of Optical Electronics in Air Platforms [V. Sofronov; pp 45-46]	30
Naval Forces of the Netherlands [Yu. Kravchenko; pp 47-52]	31
Diesel Submarines [V. Kipov; pp 53-57]	35
Communications Possibilities Using Neutrino Clusters [E. Viktorov and S. Aleksandrin; pp 57-59]	39
Commando Units of the Italian Navy [B. Bulushevskiy; pp 59-61]	41
The Financing of Weapons System Development Programs for U.S. Strategic Offensive Forces [N. Makarov; pp 63-69]	42
FY 1987 Budget and Force Build-Up of the Japanese Navy [Yu. Yurin; pp 69-71]	47
Bundeswehr Pipeline Battalion [Yu. Korolev; pp 72-74]	49
British Ground Forces Mobile Task Force [S. Anzherskiy; p 75]	52
American Underwater Signals Source [A. Prostakov; p 78]	52
Articles Not Translated in ZARUBEZHNOYE VOYENNOYE OBOZRENIYE No 10, Oct 87	53

## FOREIGN MILITARY REVIEW

### A New Stage in the Struggle for the Cause of Great October

18010041a Moscow ZARUBEZHNOYE VOYENNOYE OBOZRENIYE in Russian No 10, Oct 87 (signed to press 5 Oct 87) pp 3-8

[Unattributed article under the rubric "As We Near the 70th Anniversary of Great October": "A New Stage in the Struggle for the Cause of Great October"]

[Text] Seventy years have passed since the working class of Russia achieved its socialist revolution. The Soviet people are greeting this glorious anniversary as they accomplish restructuring, a direct continuation of the cause of October, the program and everyday practical effort aimed at perfecting socialism under today's conditions. A tremendous interest in the Great October socialist revolution has sprung up with renewed intensity throughout the world and is here to stay. The revolution's influence on the historical destiny of our Motherland and on the course of world history has been so great that it would be impossible not to note it or intentionally put it aside. The enemies of socialism attempt in every conceivable way, therefore, to distort the essence of the revolution and minimize its significance. They proclaim that it is an "error" of history. Every individual who studies the 20th century in an unbiased manner, however, reaches the inescapable conclusion that our revolution is the most prominent event of the century. The CPSU Program stresses that "the Great October socialist revolution marks a turning point in world history and has determined the general direction and basic trends of global development. It has initiated a process for which there is no turning back—the replacement of capitalism with a new, communist, social and economic structure."

In the first place, Great October changed the essence and pace of historical development of a vast country which occupies one-sixth of the earth's land surface area and where over a hundred nations and peoples live. Although capitalism's social structure entered the stage of imperialism at the beginning of the 20th century, the concentration of industry and capital characteristic of it was achieved only in a number of areas. In the vast Asian expanses of Russia and over a significant portion of her European territory, the patriarchal-communal and feudal life structures were still preserved, agonizingly accommodating to bourgeois social attitudes. Lawlessness, poverty, backwardness and ignorance characterized the people's lives. It seemed there would be no end to it and that the cruel exploitation and oppression would continue forever. But Soviet rule took just a short time to eliminate age-old barriers to the historical development of the people.

Under the leadership of the Communist Party the working peoples of all nations and nationalities realized such great historical achievements as industrialization, collectivization of agriculture, a cultural revolution, and an

equalization of the socio-economic and cultural levels of the peoples and regions of the country. The revolutionary enthusiasm and heroic labor of the masses delivered the country from a state of centuries-old economic backwardness, illiteracy and cultural deprivation, and led it to the far reaches of scientific and technological progress, universal literacy, and the attainment of modern frontiers in many spheres of world science and culture. Over a short historical period the Soviet people were able to achieve grandiose socio-economic and scientific-technological designs, such as the production and development of atomic energy, space exploration and the attainment of a fundamentally new level of industrial and agricultural production.

All of this was achieved in spite of the low initial levels of development and under conditions requiring the surmounting of exceedingly great difficulties brought about by the hostile policies of imperialist states, economic and political blockades, subversive acts, intervention, the Fascist invasion, and the burden of having to make great expenditures for defense.

There have also been serious, dramatic and tragic chapters related to a loss of initiative and energetic activity, damaging the cause of Great October and leading, in the final analysis, to a slowdown of the natural, historical process of socialism's progressive development in the seventies and the beginning of the eighties. This situation became a source of serious concern for the Communist Party and all the Soviet people, as well as for the true adherents of socialism throughout the world. Enemies of socialism have been relying on the collapse of our country's social structure. Scientifically analyzing the situation, the April 1985 CC CPSU Plenum put forward a program of acceleration and restructuring and opened up a new stage in the struggle for the cause of October.

Secondly, the Great October socialist revolution introduced momentous changes into global development, into the struggle being waged by revolutionary and democratic forces for peace and social progress, and into international relations. It advanced the process of democratization and humanization of relations among states and peoples on the scale of the entire world community. Prior to October the nature and essence of such relations had been determined by a handful of imperialist powers which had created a global system of colonial oppression of peoples backward in their historical development. At the same time, they carried on an incessant military-political confrontation among themselves to achieve a dominant position in the world. The result of this confrontation was the first world war, inflicting untold calamity and suffering on the peoples of our planet. The Great October socialist revolution joined into a single entity the struggle for socialism and the struggle for peace.

From the very first days of its existence the Soviet government assumed a decisive role as the enemy of the unjust system of international relations propagated by

imperialism then and now using brute force, a system which constantly engenders conflicts and wars on our planet.

The first decree of Soviet rule was the Decree on Peace drawn up by Vladimir Ilyich Lenin. It proposed the concluding of a just peace by all warring states, a peace without annexation or reparations. Proposals of the Soviet government to change the nature and essence of international relations on the basis of democratic and humanitarian principles were met with hostility and open malice by ruling circles of the imperialist powers. But they were received with joy and hope by the working people of all countries and by all progressive people.

As an example of its socio-economic development and tireless struggle for peace and social progress in the international arena, the country of October is making a tremendous contribution to the development of the world community, and to the processes of democratizing and humanizing domestic and international life. Naturally, the slowdown, stagnancy and appearance of other phenomena foreign to socialism have diminished this contribution. But the mistakes of the past serve as lessons for those who are genuinely fighting for peace, democracy and social progress and enable prevention of their recurrence. Without a doubt this has facilitated accomplishment of their historical missions. Colonized, semi-colonized and dependent peoples have recognized in the Soviet state a true friend who implicitly acknowledges their rights to political and economic independence and who supports their struggle for these rights.

The very fact of existence of the USSR, its internal development and consistent policies of counteracting the dictates of imperialism, thwarting the spread of inequality and oppression of other peoples, providing them diplomatic and political support and assisting them in their struggle for national and social liberation have facilitated the collapse of imperialism's colonial system. The Soviet Union's experience in building a new society enabled other peoples to resolve the issue of selecting a path to their historical development when the struggle for national liberation put this matter on the agenda.

The great influence exerted by the motherland of October on such objective trends in international life as the democratization and humanization of international relations has been interpreted by imperialist ideologues and politicians as "intervention" by the USSR in the internal affairs of other countries. They see "the hand of Moscow," as a rule, in the origin and development of democratic processes and processes of revolutionary liberation earnestly motivated and carried out. These are groundless accusations. The Communist Party of the Soviet Union has always rejected as incorrect and harmful leftist appeals for "instigating" revolution, for "exporting" it to other countries. As far as the influence of example is concerned—that is a matter of free choice for every people. The USSR has rendered and continues to render material assistance to the peoples of other

countries in their struggle for national and social liberation upon their request, when they find themselves subject to external aggression, when there is direct evidence of the export of counterrevolution.

In tearing apart the chains of global dominance by the monopolistic bourgeoisie, the Great October socialist revolution paved a major highway for all of mankind leading to peace and social progress. The revolution was a decisive, selfless assault undertaken by the working people of our country against a system of exploitation and oppression and marks the beginning of the people's construction of a new social system without exploitation or oppression, a communist social and economic structure. Only high social ideals and historical aims intelligible to the popular masses could inspire them to undertake such a revolution. These aims and ideals embodied the age-old dreams and aims of the working class struggle, enduring values shared by all mankind. Now come to life, they are practicable ends which at the same time present many difficulties with respect to realization. V. I. Lenin taught that realization of these ends required not only liberation of the working class from exploitation, but their self-liberation as well from the "internal slavery" of petty bourgeois dissoluteness, lack of culture, passivity, dependent attitudes and other negative social and moral-psychological phenomena in people's individual and collective behavior engendered by the system of exploitation and foolishly organized personal lives, imprudent individual and collective behavior. Many times V. I. Lenin pointed out that "conquering one's own disorganized behavior, one's petty bourgeois dissoluteness, is the most difficult thing to do. It is a million times more difficult than crushing the oppressor-land owner or oppressor-capitalist, but is at the same time a million times more productive in the creation of a new organization free of exploitation." (Complete works, vol 38, p 371).

The main goal of the cause of October is the emancipation and development of the creative and constructive forces of man's labor and of his humanistic qualities. All the social reforms of October—with respect to political rule, property, social and spiritual life—were directed to this end. Prior to this time not a single social revolution raised (much less practically resolved in a thorough and comprehensive manner) issues concerning the rights of man as did the Great October socialist revolution. Granting man the opportunity of labor and, consequently, granting new rights to the overwhelming majority of people—rights they did not have and could not have under capitalism—was accompanied by the establishment of new conditions and guarantees for their realization in everyday life. These are among the fundamental ideals and goals of October.

At certain stages in the history of Soviet society there have been instances in which socialist lawfulness was violated and where attention slackened with respect to strict observance on the part of responsible individuals, organizations and institutions of the constitutional rights

and obligations of Soviet citizens. Such instances represent a most flagrant deviation from the ideals and goals of October and have been resolutely condemned by the party and the Soviet people. One of the most important aims of restructuring is the creation of guarantees which will preclude them in the future. All those negative processes and phenomena which have slowed down the progressive expansion of human rights characteristic of socialism are being eliminated from our lives. At the initiative of the Communist Party and under its leadership, a decisive struggle is being waged in the country against bureaucratism, inattention to the social interests of the working people, abuses of official position, wage-leveelling, unjustified restrictions in the organization of individual labor activity—in short, against everything that directly or indirectly hinders or retards the development of man and, consequently, of Soviet society.

Apologists of capitalism zealously accuse socialism, to include our country, of human rights violations. In doing so they strive to lessen the attractive force of socialism and distort the essence of restructuring taking place in the USSR in every sphere of the lives of the Soviet people. They present capitalism as expressing the interests of man and zealously safeguarding his rights. But the facts speak entirely differently. In spite of the tremendous advances of human civilization, man in the world of capitalism has, as before, no guaranteed right to work, education, social security in old age or upon losing his ability to work, nor many other rights which have become the life standard to which the Soviet man is accustomed. It is precisely under socialism that the problem of human rights and man's comprehensive and harmonious development finds its logical resolution. Restructuring marks a new stage in realization of the ideals and aims of October, in the expansion of the political, socio-economic and spiritual rights of man, and in the free, all-encompassing exposure of his human, creative and constructive essence. The CPSU and the Soviet state are ready to engage in widespread international cooperation with respect to human rights—honest and businesslike cooperation.

One of the important strategic directions in the current stage of the struggle for the cause of October is the development of socialist democracy and the establishment of genuine socialist self-government for the people in all aspects of life. The Great October socialist revolution is purely a people's revolution. It is the working class, all the working people of the country, who achieved this revolution in order to become and forever remain the true rulers of their historical destiny, in order to rid themselves once and for all of the "bountiful charity" of the exploiting classes. To teach the working people to run the entire course of social life—this is the ideal and lofty practical goal of October. Socialism and democracy are inseparable. In November 1917 V. I. Lenin stressed: "Socialism is not established by decree from above. Formal, bureaucratic automatism is foreign to its spirit. Living, creative socialism is the product of the popular masses themselves." (Complete works, vol 35, p 57).

Each stage in the consolidation of socialism in our country is also a stage in the development of socialist democracy and the practical realization of the ideals and aims of October. Our successes and achievements in every sphere are related to the realization of the creative and constructive potential of socialist democracy. Likewise, difficulties and complications arising as we proceed have been connected, as a rule, with slips and violations in the functioning of socialist democracy. The lagging pace of socio-economic development in Soviet society in the seventies and the beginning of the eighties, for example, the appearance of a braking mechanism, and the propagation of phenomena foreign to socialism all constitute negative processes related to deficiencies in the functioning of socialist democracy, to diminished criticism and self-criticism, openness, and monitoring, especially monitoring from below. At the April 1985 CC CPSU plenum and at the 27th party congress, the Communist Party adopted a number of decisive measures to eliminate these phenomena which contradict the essence of socialism, and the ideals and aims of October. The January and June CC CPSU plenums of 1987 comprehensively established that democratization is a determinant condition of restructuring.

Socialist democracy is also organic and intrinsic to the Soviet military establishment. This is manifest in the truly democratic framework of the Soviet Armed Forces and all its component units as well as throughout the tenor of life of its servicemen. The principles of unity of command and rigid military discipline do not contradict the principles of socialist democracy or the development of popular, socialist self-government.

Implementation of CPSU statutes aimed at developing democracy in all aspects of the lives and activities of the Soviet people presupposes a maximum degree of individual and collective organizational effort, of individual and collective discipline on the part of the Soviet people. It assumes a rapid and truly revolutionary enhancement of their legal and political levels. Our new stage in the development of socialist democracy and our advancement along the path to further realization of this important ideal and practical aim of October urgently task the Soviet people with a mission: of insistently and rapidly learning democracy, asseverating lawfulness, and enhancing their legal and political levels. Learning to live, work and fulfill our military duty under conditions of rapidly developing democracy, of rapidly growing demands with respect to discipline and organizational effort on the part of individuals, as well as labor and military collectives—this is the order of the day. And everyone is obliged to learn it—from worker to minister, private to marshal. The party has stated the matter thus and sees in it an important condition and means for effecting the revolutionary continuation of the cause of October.

One of the basic ideals of October which lie at the center of attention of restructuring is social justice. The requirements and criteria for social justice proclaimed by those

who carried out the revolution of those October days expressed not only the mood of the working masses during the period of revolutionary apogee, but also the interests of the historical process leading to a society of complete social equality.

The Great October socialist revolution is our decisive battle against social injustice in all its manifestations, including the forms of exploitation, swindling, embezzlement, bribery, extortion and multi-faceted parasitism. October determined the fundamental index of social justice: a proper material and moral evaluation of man's labor for the good of society, in the interests of consolidating and defending socialism. The days of revolution determined and brought into being the major directions for consistent realization of the basic principle of socialism: "From each according to his capabilities; to each according to his labor."

In managing the restructuring effort, the CPSU has acutely raised issues dealing with the struggle against all kinds of withdrawal, against the slightest infractions with respect to social justice. Beginning from about the mid-seventies, unfortunately, certain negative phenomena were propagated in our society such as the practice of extracting unearned income, parasitism, misappropriation and bribery. Matters originated under criticism expanded in size; wage-leveling and other direct and indirect violations of the principle of social justice spread. Having undertaken the course towards acceleration and restructuring, the party has declared relentless war against plunderers and bribers, bureaucrats and eyewash experts, transgressors of labor discipline and drunkards—against all who defy the standards of our socialist way of life. The party and the Soviet state undertake these measures with universal approval and support. Our people look upon them as the continuation of the cause of October under today's conditions.

The Soviet Armed Forces have always been not only the means of defending the ideals and achievements of the working people and social justice, but also a school for educating their personnel. Unfortunately, violations of the principle of social justice which occurred in society were also to be found in the armed forces. These were seen in more and more frequent instances of abuse of official duty position and inadequate attention being paid by some in the military leadership to the social sphere and everyday concerns of personnel. There were other negative phenomena as well. The restructuring process will involve decisively eliminating such instances.

Continuing the cause of October means affirming internationalism everywhere, in everything, and being unwilling to tolerate the slightest manifestation of nationalism. Faithfulness to the ideals and historical aims of the great revolution is faithfulness to internationalism. This is intrinsic to the party of Lenin and has always been an

unshakeable principle of its ideology and policy, gaining it the trust of all the peoples of our country and the working people of the entire world.

October elevated internationalism into an ideal, a principle, and a practical task of the Soviet government. It is this kind of approach over 70 years of post-revolution history that enabled us to resolve the nationality question in our country in the complex form in which it was passed to socialism from the old social order. In this regard our state has made an outstanding contribution to world civilization. Internationalism has become a powerful factor in unifying the Soviet people, a valuable historical quality for all the nations and peoples of our state. It is the Soviet Union's basis for fraternal relations with the peoples of other socialist countries, for friendship and solidarity with peoples of the developing nations, with working people of the entire modern world community.

Nationalism, which has brought and continues to bring so much suffering and disaster to the peoples of the world, was deprived of its class-economic and political-ideological base among the popular masses of the USSR. Instances of its relapse on an individual and group basis are primarily a consequence of subjective factors: a slackening of effort in conducting internationalism education, neglect in pursuing the principles of Leninist national policies, etc.

The party believes that the restructuring effort taking place in the country will signal a rise of Soviet society to a qualitatively new level of international unity. In this regard the party realizes that improving and perfecting national relations, like any lively issue, presents new problems. These are being resolved, and will continue to be resolved, based on the principles of Leninist national policies, sensitive to everything affecting national interests and irreconcilable with all manifestations of nationalism or chauvinism.

These party statutes demand restructuring and earnest improvements in the internationalist education of personnel in the armed forces. They require improved efforts to achieve cohesion in the multi-national military collectives and effect greater cooperation, to strengthen our international military brotherhood with the armies of other countries in the socialist community.

The peoples of this planet know that October means peace, although those who unleashed a civil war and organized foreign intervention and an invasion of the Country of Soviets have suggested the opposite to them for many decades. Today their successors and followers are alarming the peoples of many countries with "the Soviet military threat."

But the facts, as it is said, are stubborn. In the 70 years of its history, the Soviet state has made a tremendous contribution in the struggle of mankind to achieve a just and stable peace, to change the nature of international

relations and effect a new way of thinking. Without this contribution the world community would have no alternatives, no possibility of avoiding the global nuclear war which threatens to put an end to its existence and destroy life on earth.

Continuing pursuit of the cause of October under today's conditions requires activating the struggle for peace, which must respond to the nature of the military danger. The course of restructuring and accelerated development being followed by the CPSU signals a new stage in the struggle for peace, for general and all-encompassing international security—these are the fundamental ideals and aims of October, the realization of which has acquired a qualitatively new historical meaning for our times.

For now, however, ruling circles in the United States and the other imperialist countries have not been exhibiting a sober approach towards the idea of establishing an all-encompassing system of international security. They look at these problems from a position of class and nation-state egoism, of shameless militarism. The U.S. administration has not renounced the imperialist policies of hegemonism. It has not given up the hope of social revenge and continues to entertain itself with the illusion of a power conflict. Washington has no desire to renounce the arms race and is attempting to station weapons in space from where it can threaten all mankind. It is encroaching upon strategic military parity, undertaking efforts to achieve military superiority. The United States and NATO are effecting large-scale military preparations and increasing their military presence near the territory of the USSR and other socialist countries. They continue to violate air and sea borders in provocative fashion and nurture delirious ideas of dismantling the social systems in socialist countries. All of this creates a military threat and produces dangerous tension in the world that could lead to a universal conflagration. It presents a danger to the destiny of mankind.

It is under these circumstances that the socialist countries promulgated in May 1987 a military doctrine for the Warsaw Pact nations. Its chief provisions reflect a new political thinking on questions of war and peace in the nuclear age, on questions of defense and securing peace for all nations.

The chief distinguishing feature of the Warsaw Pact's military doctrine, like that of the military doctrine of each member nation, lies in the fact that it is subordinate to accomplishing the cardinal task mankind faces today—of preventing war, whether nuclear or conventional. The defensive nature of Warsaw Pact doctrine is manifest in all practical matters we engage in, whether domestic or foreign-policy oriented, and in our military projects.

As a result of the consistent, constructive policy of the Soviet Union and its allies, an understanding was reached at negotiations in Washington in September 1987 for concluding an agreement between the USSR and USA with respect to medium-range and long-range tactical missiles. But Washington, being forced to take this step, explains the so-called "compliance" on the part of the Soviet Union in the negotiations as being a consequence of the build-up of its own military might, exerting pressure on the USSR. This does not conform to reality. Indeed, the Soviet Union does not merely go its half of the way with respect to the international struggle to achieve nuclear disarmament, but is taking an earnest further step toward its partner. It is doing so, however, guided exclusively by a responsibility for the destiny of the civilized world, by the ideals of the Great October.

The prevention of war and the readiness to repulse an aggressor are interrelated. The Soviet Armed Forces have always been an important factor in maintaining peace. But today their role and responsibility in this regard have increased many times over. The military might of the Soviet Army and Soviet Navy, the high level of professional military readiness of their personnel, and personnel loyalty to the Communist Party and the Soviet people restrain the aggressive aspirations of the reactionary circles of imperialism, prevent them from resorting to military force with impunity, and deny them the hope of achieving their hegemonic aims.

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9768

#### Protracted Nuclear War

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[Article by Lieutenant General of Aviation G. Konev and Major General V. Pokrovskiy, Doctor of Military Sciences: "Protracted Nuclear War (according to the views of U.S. military experts)"]

[Text] Over the period of more than 40 years since the United States built the first nuclear weapon, the basic principle behind each of the existing American military strategies—"massive retaliation" (in the 50's), "flexible response" (in the 60's), "realistic deterrence" (in the 70's)—determining the goals, forms and methods of using these barbaric means of annihilating people has never changed: open nuclear blackmail and the threat of using nuclear weapons under any set of circumstances. This principle, elevated officially by Washington to the rank of a political instrument designed to achieve its aggressive hegemonic aims, is embodied today in a doctrine of "neo-globalism," reflecting the aspirations of the most reactionary military circles to achieve world domination and relying on the use of force as the most important means of resolving foreign policy matters.

The basic principles of U.S. military policy for the 80's are formulated in that very same aggressive spirit. The main purpose of this policy consists of "direct confrontation" with the Soviet Union on both a global and regional scale. The aggressive nature of this policy, directed towards achieving "complete and undeniable military superiority by the United States," was analyzed thoroughly at the 27th CPSU Congress and has also been critically examined in the work of Soviet military experts.

Not very long ago (end of the 70's, beginning of the 80's) a keen analysis was made of the persistent striving by the U.S. military leadership to "instill" in people's minds the idea of the possibility of waging a "limited" nuclear war under today's conditions, presenting this as a more "humane" form of military operations as compared with the use of nuclear weapons on a massive scale. What is the real reason behind the Pentagon's "humane concerns" with respect to the fate of the peoples of the world? According to material recently published by a number of American military experts, the ideologues' concept of "limited" nuclear war is based, first of all, on such a war envisioned as being waged at any of the world's "hot spots" (excluding the territory of the United States and adjacent regions in this regard). Secondly, Pentagon strategists ascertained that, by the end of the 70's, a condition of approximate parity had been established between the USSR and USA with respect to strategic nuclear weapons carriers. As far as numbers of nuclear warheads mounted thereon were concerned, the majority belonged to the United States. According to the views of foreign experts, unlimited (massive) use of strategic offensive forces under these conditions would give the U.S. no advantage in achieving its political aims, for the warring parties would inflict "unacceptable damage" on one another and would place in doubt the possibility of continued existence of the states.

At the same time American strategists would strive to realize the potential of their supposed existing advantage in strategic nuclear arsenals through "limited" nuclear strikes. In their opinion, such strikes would have their effect in the long run and, at a certain stage of "dosed-out" nuclear exchanges, should lead to exhaustion of the Soviet Union's war potential, denying it the ability to inflict "unacceptable damage" upon the United States. In evaluating the American concept of "limited" nuclear war, foreign observers stress that the essence of such a plan lies in expanding the functions of nuclear weapons as a deterrence factor in the scenario that would develop, and in striving to turn this means of conflict into a practical instrument enabling "painless" attainment of certain political and strategic goals in a conflict with the Soviet Union.

The conclusions drawn by the U.S. military-political leadership with respect to possible use of strategic weapons in limited armed conflicts have also resulted in substantive changes in the planning process for the use of nuclear weapons. The Pentagon was tasked with timely

development of a large number of courses of action for possible application in crisis and conflict situations. The essence of such diverse planning amounted to a detailed analysis of every hypothetical situation affecting U.S. interests in which nuclear weapons might be used, and to choosing the forms and methods for inflicting nuclear strikes depending on the situation. According to American press reports, the existing "Single Integrated Operational Plan for Destruction of Strategic Targets (SIOP)," developed by American planners with the aim of inflicting massive nuclear strikes, contained at the end of the 70's a great many (over 200) selective variants for limited and regional application of nuclear weapons. Such plan variants are played out regularly over the course of major training exercises conducted by the U.S. Armed Forces.

Simultaneously with the development of plans for limited use of strategic offensive forces, the Pentagon has been searching for new ways to achieve military superiority, even under the conditions of qualitative and quantitative parity in the Soviet and U.S. nuclear arsenals which, according to American experts, was achieved at the beginning of the 1980's.

Ever since the Reagan administration came to power, the idea has been propagated ever more persistently of the possibility of conducting a protracted nuclear war (1), and of the decisive role played by the readiness of strategic forces and the country as a whole for such a war, in which the United States could achieve a victory. Expounding in 1982 on the position of the country's military-political leadership on military issues, Secretary of Defense Weinberger officially pointed out the necessity of building nuclear forces which have "reliable survivability even under the most adverse conditions of protracted nuclear war." Requirements for "reliable survivability" led to a rethinking of positions concerning the construction and combat employment of offensive strategic forces. This, in turn, led to the concept of "active counteraction," which treated protracted nuclear war. According to the U.S. Secretary of the Navy, this concept "was developed to improve U.S. options and attain superiority." Although the author of these illusory aspirations neglects to state over whom it is necessary to "attain superiority," foreign experts see this as another attempt to achieve superiority over the Soviet Union under today's conditions. At what cost is the Pentagon planning on fulfilling its aims?

According to the Pentagon leadership, the waging of a protracted war will require nuclear forces to have, first and foremost, a high degree of survivability, flexibility, and the ability to maintain a combat-ready condition over the course of an extended period. Here it is stressed that the effectiveness of nuclear weapons employment in a war of extended duration will be determined to a great degree by the reliability and survivability of support systems—guidance, communications, early warning, reconnaissance, nuclear strike monitoring, technical maintenance, logistical support, etc.

The concept of "protracted nuclear war" has necessitated radical change in the basic planning principles for all phases of combat operations with respect to U.S. strategic offensive forces, since earlier plans thoroughly treated matters relating only to delivery of the first nuclear strikes—subsequent operations were not actually developed. The new views assign special significance to the creation of necessary reserve forces, to be employed in accordance with plans for waging protracted nuclear war. Finally, American experts believe it is necessary to have a clear-cut idea as to the duration of such a war so as to be able to develop sound and objective plans for waging it. What then does the U.S. military-political leadership intend to do? What practical measures are being taken to realize this concept?

The orientation of United States strategic forces towards conducting a protracted nuclear war is reported by the foreign press as echoing the same message delivered by the president in an official statement five years ago on "a new strategic program" envisaging modernization and a sharp increase in the combat capabilities of all components of the triad of strategic offensive forces (land and sea-based ballistic missiles, strategic bombers); a significant increase in the effectiveness of existing guidance and communications systems so as to provide reliable command and control of strategic forces under conditions of protracted nuclear war; modernization of strategic defensive systems and a build-up in civil defense.

According to Weinberger's appraisal, taking requirements into account such as great flexibility and survivability with respect to the employment of strategic offensive forces in a protracted nuclear war presupposes the perfection of existing strike forces and the creation of new ones, taking into account the strong and weak aspects of each strategic offensive component. Thus, the high survivability of ballistic missile-carrying nuclear submarines can provide a reliable strategic strike-force reserve for waging protracted nuclear war and, with increased missile firing accuracy, they may become the chief means of destruction for targets under all degrees of protection. Effective utilization of intercontinental ballistic missiles, which have great accuracy and flexibility with regard to combat employment, may also be achieved by providing them adequate survivability. Flexibility of combat employment in this kind of war will be characteristic of strategic bombers, which, in addition to their ability to inflict strikes on planned targets, are also capable of detecting and destroying highly protected stationary and mobile targets along with providing direct human evaluation of the situation on the ground.

Implementing the requirements of its "strategic program," the United States is presently placing MX intercontinental ballistic missiles (each with 10 warheads) into their ready-for-action configuration. Also becoming operational are nuclear submarines of the Ohio variety which, beginning in 1989, will be armed with the new Trident-2 missile. The latter, it is believed,

will have practically the same range and effectiveness as the intercontinental ballistic missile for destroying highly protected targets. B-52 bombers continue to be outfitted with cruise missiles and the new B-1B strategic bomber is entering the inventory. The Pentagon is also planning on the Midgetman ICBM and ATB bomber entering the inventory of strategic offensive forces.

In addition to creating new strategic strike forces, the U.S. military-political leadership is devoting special attention to increasing the survivability of all components of the strategic triad. American experts believe that the survivability of strategic bombers in a protracted nuclear war depends on the presence of a broad network of air bases and facilities for providing maintenance and logistics support. One possible solution to this problem under consideration is the use of a great number of civilian airfields in the U.S. with runways capable of accommodating B-52 and B-1B bombers (of which there are more than 450, according to American experts). In this regard, the necessity for providing the appropriate reserves of fuel, ammunition and spare parts, as well as flight crews and technical maintenance personnel, is being taken into account.

It is believed that, in order to insure the combat readiness of bombers dispersed to airfields as described above, it will be necessary to deploy special mobile centers for repair, servicing and supply. Located on heavy-load vehicles, these centers must deploy in advance and, when necessary, must redeploy to surviving airfields, where they will organize reception and servicing of aircraft. Some of the maintenance and logistics support facilities may be pre-positioned at protected shelters in dispersed locations to insure greater reliability.

Similar methods for insuring reliability are envisaged for submarine-launched ballistic missiles, according to American military experts. These may include construction of specially protected shore structures for repair, overhaul and restoration of combat vessels and the use of floating bases for missile reloading of submarines at sea.

It has been noted in the American press that there are current plans at every missile and air base of the U.S. Air Force Strategic Air Command for restoring the fighting capabilities of strike forces. It is envisaged, for example, that bombers will land at new air bases upon completion of their combat mission, undergo a special technical servicing procedure, rearm, effect crew changes, etc. Measures have been developed for ICBM units with regard to safeguarding personnel of mobile groups tasked with restoration of fighting capabilities, equipping pre-positioned storage points with spare parts and equipment, repairing and utilizing launcher silos that have survived.

One very important effort being undertaken in the preparation of U.S. strategic forces for waging protracted nuclear war is the development of command, control and

communications systems. Experts at the Pentagon emphasize that these systems must be flexible and reliable under conditions of nuclear weapons employment on any scale. With this in mind, efforts are underway to bring airborne command posts into operation on board E-4B aircraft and increase the protection afforded existing airborne command posts from the destructive effects of nuclear explosions. A new link in the command and control system for the U.S. armed forces is to be added to the existing three (main, alternate, airborne reserve) in the mid-eighties: mobile, ground-based command posts for the Joint Chiefs of Staff, operational groups of the Strategic Air Command and numbered air force commands, and ICBM launch command posts. These command and control elements may be deployed during a period of tension in regions far removed from possible targets. At the same time, communications systems are being developed in the long-wave, super long-wave, and millimetric frequency ranges. Thus, a long-wave reserve communications system is presently being deployed based on a network of automated reception and transmission stations that use a 150-175 kHz ground wave and are not affected by the ionizing or electromagnetic radiation of nuclear bursts. According to the American press, this system is designed for a special purpose—transmitting the commands of the U.S. military-political leadership to the strategic forces during protracted nuclear war. It has also been reported that special mobile command and control modules are being developed for relocating the country's highest leadership under extreme circumstances during the prolonged period.

Priority is being given to enhancing the survivability of the IMEWS early warning satellite system, establishing a network of mobile stations for receiving and processing their data, and modernization of early warning radar stations to increase accuracy in evaluating the scale of nuclear missile strikes. The Pentagon is devoting a great deal of attention to creating an integrated operational system to comb for nuclear bursts. American press accounts state that this system, an array of special sensors positioned on satellites (proposed deployment of up to 20 satellites), should be capable of detecting and determining to an accuracy of 100 meters the coordinates of nuclear bursts occurring at any location on Earth, and of transmitting information to appropriate data collection centers. According to one U.S. military representative, the system provides "a real-time damage assessment that will enable nuclear weapons retargeting during a protracted war, facilitate destruction of military targets which have survived, and rescind earlier planned strikes on targets which no longer need to be destroyed."

In Pentagon-directed studies of recent years, a great deal of attention has been devoted to matters of operations planning for strategic offensive forces during a protracted nuclear war. In this regard, many publications stress that, with the advent of the "protracted nuclear war" concept, the SIOP as formulated earlier "has become outdated, insofar as its basis had been chiefly the idea of a single, massive strike in a short-lived war." A study

entitled "Protracted Nuclear War" conducted at the U.S. National War College and published in 1984, for example, proposed development of the "Warfighting Integrated Operational Plan (WIOP)" for prolonged conflict.

American experts feel that such a plan should become the basic strategy for conducting protracted nuclear war and should contain a large number of varied courses of action for the entire course of the war. They believe that major attention must be devoted to developing new principles governing the combat employment of nuclear forces, dispersal of nuclear missile forces, formation of nuclear missile strikes, and the creation and employment of a strategic force reserve aimed at maintaining permanent superiority over the course of multiple exchanges of massive nuclear strikes. It is envisaged that such a reserve will include, in addition to submarine-based missiles, a portion of the ICBM force, dispersed strategic bombers, and sea-based cruise missiles capable of retargeting and redeployment to any region over the entire course of the protracted nuclear war.

In evaluating the particulars of a plan for protracted nuclear war, American military experts point out the necessity for optimal distribution of strike forces earmarked for the first and subsequent strikes and for creation of a strategic reserve which would be able to maintain a combat ready state for a prolonged period of time. It is believed that the new plan, like the SIOP, should include not only strategic offensive forces, but all varieties of long-range tactical and tactical nuclear forces, employment of which might play an important role in the achievement of major political aims over the course of an extended war.

Preparing for a protracted nuclear war, the American military-political leadership attaches primary importance to questions of command of the armed forces during such a war. With this in mind, a special procedure has been instituted for emergency situations in which the powers of the highest national leadership are transferred to appropriate successors, each of whom must know his responsibilities, the order of succession to his post and how to execute the functions entrusted to him in commanding the armed forces. The transfer of national power among presidential successors proceeds in the order of vice-president, Speaker of the House of Representatives, President Pro Tempore of the Senate, Secretary of State, other cabinet members, etc. (16 individuals in all). Succession of military power, normally exercised by the Secretary of Defense, proceeds to his deputies, the Secretaries of the Army, Air Force and Navy, their assistants.

The National Institute for Military-Political Problems published a study in May 1983 in which it was confirmed that all procedural matters concerning the organization and transfer of power are entrusted to the Federal Emergency Management Agency (FEMA), which has at its disposal a centralized data collection system for locating the president and his successors at all times and

draws up plans for their evacuation and dispersal in wartime conditions to airborne command posts and protected command elements. FEMA conducts quarterly exercises to check these plans and evaluate the functioning of the data collection system with respect to the location of the President and Secretary of Defense and their successors.

The American press published widespread reports on the "Ivy League'82" special exercise which, for the first time, realistically treated matters of preparing the U.S. military-political leadership for running the country and directing the armed forces during the course of protracted nuclear war. The chief purpose of this demonstration of force, which the American leadership did not even attempt to conceal, consisted of a "realistic evaluation of United States capabilities to survive and conquer in an extended nuclear missile war." According to the exercise scenario, leadership of the country and the armed forces was transferred sequentially to presidential successors (who were dispersed beforehand) in accordance with the procedure established by the U.S. Constitution. The sequence of transfer of power was accomplished under conditions of constant contact among successors.

Questions concerning the use of ICBM's and strategic bombers under conditions of extended war are also regularly worked out at annual U.S. "Global Shield" exercises. R. Ellis, former commander of the USAF Strategic Air Command, stated that, along with "checking the execution of operational plans for employment of strategic air and ICBM forces in a variety of circumstances, particular attention is paid in such exercises to operations of these forces under conditions of an exchange of nuclear strikes, and to maintaining their fighting capabilities over a prolonged period." The exercises also evaluate the ability of strategic forces to restore their fighting capabilities and prepare for subsequent massive strikes, to regroup personnel and materiel, to organize control and operation of alternate means of communications.

On the whole, if we analyze the essence and direction of current United States military policies and specific plans for the development of U.S. strategic forces, the aggressive aspirations of American imperialism become sufficiently clear. Under the present conditions of military-strategic parity between the United States and the Soviet Union, Washington is attempting to impart to its nuclear potential such ability as will enable it to—in the words of the U.S. President—"prevail in a protracted nuclear war." Whereas before the U.S. leadership concealed its doctrine and concepts of "waging nuclear war" in bombastic, defense-oriented phraseology on the need to "restrain" the Soviet Union, the Reagan administration has now discarded such deceitful punctiliousness and discusses openly the development of such war plans against the Soviet Union. Thus, in one of his official

statements, Weinberger reveals openly that "the requirements of the new concept of protracted war are based on a belief in the possibility of winning it."

It is quite evident that these imperialist ambitions of the U.S. leadership will not stand up to criticism. If we take a look at the history of previous wars, it is easy to see that the scale, duration and results of wars, even using conventional means of destruction, fail to conform, as a rule, with predictions. M. S. Gorbachev has provided a worthy and convincing response to the American "creators" of new nuclear concepts: "Those who resort to reasoned arguments concerning 'limited', 'transient' or 'protracted' nuclear wars, are still, apparently, the prisoners of obsolete stereotypes fostered when war was a great calamity but did not threaten, as it does today, the destruction of mankind. The nuclear age unavoidably dictates a new political thinking." But, as the actions of the present American administration show, it is precisely this kind of thinking that the U.S. military-political leadership lacks.

#### Footnote

1. In examining the possible duration of such a nuclear war, a number of American publications emphasize that this will basically depend on the restoration capabilities of the armed forces and of the country as a whole, on the effectiveness of organizational and other measures, and on a whole number of frequently unforeseen factors. With this in mind and judging from numerous publications, American military experts believe that the duration of a protracted nuclear war might comprise from two months to half a year or somewhat more.

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9768

**The AIDS Problem in the U.S. Armed Forces**  
*18010041c Moscow ZARUBEZHNOYE VOYENNOYE OBOZRENIYE in Russian No 10, Oct 87 (signed to press 5 Oct 87) pp 13-18*

[Article by Colonel A. Petrov: "The AIDS Problem in the U.S. Armed Forces"]

(Text) A great deal has been written recently in the foreign press about the exacerbation of problems related to AIDS (Acquired Immune Deficiency Syndrome) in the western and developing countries. The sickness is threatening to grow into a dangerous pandemic (an epidemic of huge proportions) and instances of it have been noted in almost every country in the world. About 60,000 individuals now have the disease. According to World Health Organization data, there will be up to 10 million people of the world infected with this ailment—called "the plague of the 20th century"—in 1991.

By summer of 1987 in the United States approximately 40,000 cases were reported, of which more than half have resulted in death. Those afflicted come from all segments of the population and from the armed forces. Thus, in 1985 more than 40 servicemen were undergoing medical treatment at the U.S. Army's scientific research center at Walter Reed Army Hospital (Washington, D.C.).

The first instances of AIDS sickness in the United States were observed in summer 1979 and a systematic accounting of those afflicted with the disease has been in existence since July of 1981. By the end of 1983 the first 1000 individuals with AIDS in the United States (of which 75 percent were homosexuals) had been registered. Drug addicts who take drugs intravenously constituted the second largest grouping (13 percent).

It was believed initially that, based on these reports, AIDS would strike only the above-mentioned sections of the population. It has been established, however, that the illness may be transmitted through regular sexual contact in the same manner as other venereal diseases. Thus, according to data obtained by observing a group of servicemen at the scientific research center at Walter Reed, about one-third of those afflicted acquired the disease through ordinary heterosexual contact.

Increased levels of the disease have also been noted among hemophiliacs, who sometimes receive blood transfusions from AIDS-pathogenic donors.

According to one hypothesis being disseminated in the West, the AIDS pathogen is a variety of virus observed in African green monkeys, which themselves exhibit no visible pathological changes due to it. There is also speculation that the AIDS virus was created in Pentagon laboratories. It has been reported in the Irish newspaper "Sunday Press" that such a conclusion was reached by three scientists from various countries working independently of one another. One of these, French scientist J. Segal, is certain that the virus was obtained in secret U.S. military laboratories at Fort Detrick, Maryland, where research is conducted on people sentenced to various terms of confinement. Such individuals are promised their freedom after the experiments are performed. Segal believes the virus escaped from the laboratories in the following manner. The incubation period turned out to be too long—several years. Not desiring to wait for experiment results or to consider the experiment unsuccessful, the creators of the virus decided to "free the experimental material," which resulted in the epidemic we now see.

AIDS is a severe, body-wasting disease which almost always proves deadly. Early symptoms include medication-resistant fever, swelling and enlargement of the lymph nodes—especially in the neck, underarm and groin areas, increasing weakness overall, persistent diarrhea, emaciation, enlarged liver and spleen. First and foremost, a severe depression of the body's natural

immune system takes place, along with related complications. AIDS victims are most often struck with two accompanying illnesses: pneumonia and Capozi's sarcoma, the latter being a form of skin cancer. AIDS is accompanied by prolonged fevers (unaffected by antibiotics), significant weight loss, and emaciation.

Research is being conducted in the United States and other Western countries to discover an AIDS preventive vaccine. This task is complicated by the fact that the AIDS pathogen undergoes swift changes. In addition, there exist several varieties (strains) of the virus which have significant antigenic differences. Researchers believe that the traditional methods of developing immunal-preventive means for treating viral sicknesses are ineffective with respect to finding a preventive vaccine for the AIDS virus. Vaccines are most frequently produced on the basis of specially-obtained viral strains which are harmless (i.e., they do not cause illness), and, upon being introduced into an organism, retain the ability to provide an immune reconstruction. Experts believe, however, that such a vaccine for preventing AIDS could be dangerous, insofar as the variability exhibited by this virus makes it capable of again acquiring pathogenic properties.

It is believed that the best prospects for fighting this disease are to be found in the creation of an AIDS vaccine through genetic engineering. Genes responsible for synthesis of the basic viral protein antigens are secreted from the surface of the viral membrane. These genes are implanted in bacterial vectors (*E. coli*, for example) and used to obtain viral protein which can be used to produce a vaccine. Studies are being conducted to ascertain the possibility of implanting genes from the AIDS virus into another virus—the cowpox virus, for example, innocuous to man—which would then be introduced into the organism for purposes of immunization. Production of a useful vaccine will involve inclusion of AIDS virus genes with the most dangerous properties of the majority of its variations, primarily the ability to strike T-lymphocytes and thereby suppress the body's immune system.

Research is currently being conducted in the United States with experimental forms of a vaccine for preventing AIDS on anthropoid apes susceptible to the disease. According to press accounts, one such specimen will be sent for clinical testing in 1987 to the National Institute of Health (Bethesda, Maryland). An employee at the Pierre and Marie Curie Institute in Paris by the name of Zigmouri developed an experimental vaccine there and used it on himself. Test-tube analysis of his blood showed immunity with respect to the virus. AIDS immunization data is available from studies conducted in Zaire on a small group of volunteers. On the whole, however, experts believe that a vaccine for AIDS prevention will not be fully developed or come into widespread use in the United States and other Western countries until at least the middle of the 1990's.

In January 1987 the U.S. Food and Drug Administration approved use of the drug AZT for medical treatment of AIDS. According to experts, this is the first therapeutic remedy capable of helping some of those afflicted. When ingested, AZT causes destruction of viral particles at the instant of their reproduction. Particles in a state of rest retain their vital capacity. AZT thus halts viral reproduction without killing the virus, and this improves the condition of the person afflicted. One drawback to this remedy is its high toxicity. In some individuals it suppresses the body's production of erythrocytes and white blood cells in the bone marrow. American specialists are working on improving the AZT structure.

Discussion is widespread in the United States on the question of those afflicted with AIDS, on attitudes towards them in the workplace and other spheres of social life. In 1986 the Justice Department published a legal interpretation prohibiting any discrimination against individuals "due to their decreased work capacity resulting from affliction with AIDS or any similar illness." A stipulation was made at the same time which enabled firms or corporations to discharge individuals suffering from any disease that would present a danger in the work community from the point of view of possible contamination of others. According to the Center for Disease Control, "personal contact (excluding sexual) that can be expected to occur in the work place under normal conditions poses no risk for transmitting the AIDS virus from afflicted to healthy individuals." In spite of this, conditions at many firms and establishments are becoming intolerable for those stricken with the virus and suffering from AIDS. Instances of ethics violations in this regard have been published. Afflicted individuals are quite often discharged under a variety of pretexts. A number of firms conduct personnel testing to determine carriers of the AIDS virus and attempt to get rid of those contaminated. Some enterprises require certification upon employment as to absence of the AIDS antibody (i.e., evidence that an individual is not contaminated).

On the whole, the same attitude prevails with respect to those with AIDS in the U.S. Armed Forces. Relevant provisions pursue the aim of preventing AIDS virus-carrying recruits from entering the service and releasing those who are on active duty. Since July 1985, the medical service has been conducting mandatory testing of stores of donated blood for absence of the AIDS antibody. Donated blood found to contain this antibody (i.e., blood contaminated with the virus) must be destroyed. U.S. civilian health agencies which receive donated blood have been conducting such testing since 1984. As a result, official data show that the risk of AIDS contamination from donated blood has been minimized and does not exceed 1 per 100,000. Preventing contamination in this manner, however, civilian health agencies are not interested, as a rule, in the donors themselves who turn out to be carriers of the virus. In contrast to this, the armed forces have established procedures for informing appropriate medical service agencies as to all

military donors who test positive. In each specific instance, the source of donor contamination is identified and measures taken to prevent further spread of infection.

A 30 August 1985 directive of the U.S. Deputy Secretary of Defense has established procedures for mandatory AIDS blood testing for all personnel selected for military service. Individuals who test positive, whether suffering from the disease or simply carrying the AIDS antibody, are not accepted for duty. Testing is accomplished at recruiting stations as part of the overall medical examination.

The Secretary of Defense directive "Principles Governing Identification of Servicemen Infected with the AIDS Virus, Medical Supervision and Care," dated 24 October 1985, provides for appropriate testing of all armed forces personnel. The well-known immuno-enzymatic method of blood analysis (Western blot test) is used in this regard for testing donor blood samples as well as individuals entering military service. The directive determines criteria for treating servicemen with AIDS as well as those simply carrying the virus. At the end of 1985 the U.S. Congress authorized a special-purpose allocation (outside administration or department of defense request) of 40 million dollars to the armed forces medical service for scientific research efforts related to the above-mentioned measures and evaluation of their results. Foreign experts see this as evidence of the great attention being paid by the U.S. legislative organ to the AIDS problem in the armed forces.

Identification of AIDS-afflicted and contaminated individuals is being undertaken in accordance with the above-mentioned directive so as to preclude the possibility of spreading the infection among personnel and prevent this factor from affecting troop combat readiness. It also prevents the utilization of such personnel under conditions incompatible with their state of health. In particular, this involves military service outside the United States in regions with unfavorable climate, where there exists the probability of significant spread of infectious diseases for which immunization is impossible. As noted in the directive, the taking of vaccines and infection with new pathogens can facilitate aggravation of AIDS and promote loss of fighting potential among personnel. Working under conditions of prolonged strain (submarine crews during extended cruises, for example) also enters the category of conditions unfavorable for those with the AIDS virus. Western experts note that timely identification of individuals afflicted with AIDS and those carrying the AIDS virus makes it possible to exclude them as blood donors to special "blood banks" as well as under field conditions. In the latter circumstance, a thorough inspection of blood received is not usually conducted and a contaminated donor will spread AIDS among patients (wounded and casualties).

In accordance with the adopted program, testing of servicemen for the AIDS antibody began in 1986 and was to be completed in the first half of 1987. It was

envisioned that the first tests would be conducted at units deployed in regions of great military significance, or those designated for rapid deployment to areas where there might be unfavorable epidemiological conditions and inadequate medical care. Further testing was programmed for personnel serving in units permanently located outside U.S. boundaries or reserve units for deployment overseas, then for units undergoing training on U.S. territory (with the expectation of possible utilization in other countries), and, finally, for servicemen belonging to all other contingents. The latter are subject to AIDS testing over the course of their regular medical check-ups at dispensaries. All personnel testing positive must undergo detailed examination at treatment facilities to determine the degree to which the infection has developed and whether the individual concerned is simply an AIDS virus carrier or actively has the disease.

Medical service branches of the military services (army, air force and navy) have jointly developed methods for analyzing the results of such testing, insuring a unified approach to evaluating the state of health of AIDS-afflicted servicemen. Procedures call for identifying sources of the contamination in each specific instance and contacts the afflicted individual has had with others (fellow servicemen, family members, members of the local civilian population) which might facilitate the further spread of infection. AIDS awareness programs are fostered in the units and recommendations made for strict observation by personnel (afflicted individuals and those around them).

Data is presently lacking with respect to the number of individual servicemen identified as AIDS virus carriers and those with the disease. It is reported, however, that blood testing of recruits and servicemen-donors has indicated a contamination level of about 1.4 cases per 1000 undergoing testing. Based on this data, army medical specialists have determined that the number of servicemen with the AIDS antibody could total from two to three thousand. The spread of AIDS in the United States is being facilitated by social phenomena (large-scale use of narcotics, sexual licentiousness). Sharply decreased funding for medical care is also a factor.

In accordance with the Department of Defense Directive, servicemen exhibiting a positive reaction to the AIDS antibody but not having symptoms of the disease, such as suppression of the body's immune system—i.e., carriers of the AIDS virus—may continue to serve in the armed forces. The directive notes, however, that they may not serve in units located outside the United States, in regions with unfavorable climatic or epidemiological conditions, or where other factors prevail which might facilitate the development of AIDS in its acute form in people infected with the virus. Individuals identified by the testing as having AIDS in its active form are subject to medical discharge while retaining appropriate rights and privileges. Discharge from active duty and loss of privileges is envisaged for carriers of the AIDS virus and

afflicted personnel who fail to heed the requirements of their command and the medical service with respect to preventing the spread of infection to other individuals.

The medical service is charged with constant observation of the state of health of those servicemen carrying the AIDS virus, and is obliged to conduct a thorough medical evaluation of such individuals on at least an annual basis. Data obtained in the evaluations is to be used in determining the further suitability of AIDS-infected individuals for continued military service in each specific case and, possibly, to help define overall policy guidelines for treatment of this category of serviceman. A great deal of attention is devoted to providing timely information to appropriate medical service agencies concerning all identified cases of the disease with the aim of taking necessary anti-epidemic measures to prevent the further spread of infection. In this regard, emphasis is placed on the significance of awareness and counseling efforts directed towards prevention of the disease among military personnel and the local population in areas where military bases are situated.

As has been noted, groups of individuals with increased risk of AIDS include homosexuals and drug addicts. Existing U.S. military regulations provide for the administrative discharge of such individuals. In this regard, a clarification of current directives states that information on personnel identified during AIDS testing by the medical service as sexual deviants or homosexuals is not to be used as a basis for taking such administrative measures. Servicemen so identified will, as a rule, be offered the opportunity to leave the service in the normal manner (i.e., without loss of stipulated privileges). The intercession of an officers' board is required in such instances, however, and action taken must be approved by the secretary of the applicable service of the armed forces.

The entire volume of AIDS-related information obtained by the medical service is sent to the scientific research center at Walter Reed for review and analysis. Experts believe that the data accumulated there will be unique in many respects, insofar as there is in the armed forces, unlike any other single American institution, a programmed and comprehensive study of this disease, beginning with data on initial AIDS infection and including extended observation of infected and afflicted individuals in hospitals and out-patient clinics. Further study of the epidemiology, prevention and treatment of AIDS is planned based on the data obtained. The question of the incubation period following infection by the virus and factors which determine its extent is among a number of questions planned for further research. It remains unclear at present whether or not all individuals infected by the AIDS virus will unavoidably contract the disease. According to American Center for Disease Control data, AIDS in its full-blown form develops in 17-30 percent of those infected. Experts at the National Academy of Sciences believe that the disease becomes pronounced in 25-50 percent of people 5-10 years after the

appearance in their bodies of the AIDS antibody (i.e., after infection). They do not rule out the possibility (nor do they categorically confirm, insofar as sufficient data has not yet been accumulated) that in time, perhaps after two decades, all carriers of the virus will contract the full form of the disease.

Experts have ascertained that the AIDS research measures planned to be conducted in the armed forces will be very labor consuming. Regular, organizational subunits of the medical services are charged with the main responsibility of implementation. In addition, supplementary, special-purpose agencies have been established to provide assistance and monitor their activities. Among such agencies are a management group for data collection on infectious diseases (including AIDS) which monitors the timeliness of obtaining and reviewing data on identified AIDS victims; a commission to evaluate laboratory diagnostics methods used in AIDS testing; a commission to propagate measures for preventing the disease among servicemen and local population in areas of troop concentration; a research advisory council for determining department of defense tasks related to the study and development of AIDS preventive measures for personnel; an advisory council on psychological and social issues involved in working among servicemen infected with the virus; a council for methods standardization with respect to making clinical diagnoses and determining the stage of development of AIDS infections. In addition to fulfilling their entrusted obligations, the above-mentioned agencies coordinate the AIDS research effort among the medical services and separate institutions of the services of the armed forces.

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9768

#### **Iran's Ground Forces**

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[Article by Lieutenant Colonel A. Palov: "Iran's Ground Forces"]

[Text] Iran's ground forces have traditionally been the foundation of her armed forces. Since their inception in 1922 they have undergone numerous reorganizations. The current organization began at the end of the 1940's under the immediate direction of the American Military Mission in Iran, specially constituted at the army's main headquarters. Large-scale revenues received by Iran for her oil exports enabled the Shah's regime to begin outfitting the ground forces with modern weapons and combat equipment in the late 60's. Development of the TOE organizational structure for command elements, branches and units, as well as the conduct of ground forces personnel training were accomplished chiefly by U.S. military specialists along the lines of American

statutes and regulations. The 1979 overthrow of the Shah's regime did not bring about any fundamental changes in the structure of Iran's armed forces. Modest changes were effected to increase combat power in the units. According to foreign military press reports, however, large and small-scale units remained practically devoid of combat effectiveness. Regular troop strength levels, noncommissioned officer and junior officer ranks were at less than 50 percent strength. Technical readiness of weapons and combat equipment had decreased sharply; deliveries from abroad had ceased.

The process of regaining combat effectiveness in the ground forces was sharply accelerated with the break-out of the Iran-Iraq conflict in September 1980. Lacking sufficient quantities of heavy armament, the ground forces command resorted to significantly increasing personnel strength, augmenting subunits to greater than prescribed levels and forming new units. According to the London Institute of Strategic Studies, ground forces strength levels increased annually by 40-50 thousand men. Already by 1987 they exceeded 300,000. Seven additional divisions were formed ( 5 infantry, 2 airborne). Strength-wise, the ground forces are second only to a new Iranian military organization, the "Guards Corps of the Islamic Revolution (GCIR)."

At the head of Iran's ground forces is a commander, subordinate to the chief of the unified staff of the armed forces, and, through him, to the supreme commander-in-chief. The ground forces commander is responsible for maintaining the fighting ability and combat readiness of his units, developing and practically implementing plans for their operational and combat employment, organizing and conducting combat training and the training of cadre at military institutions and ground forces training centers. He is responsible for organizing the technical maintenance and logistics supply of subordinate units.

The commander exercises his troop command through deputies, a secretariat and staff, the basic element of operational command of the regular and separate units. The staff is responsible for the state of the units, their combat utilization, development of the organizational structure, mobilization and operational deployment planning, the organization of operational and combat readiness of troops and headquarters, intelligence and counterintelligence, technical maintenance and logistics supply, and coordination of ground forces combat operations with the other services of the armed forces and the GCIR.

In peacetime the staff exercises direct control of subordinate division staffs, separate brigades, artillery groups, and other separate units and subunits of the ground forces. According to foreign press reports, at the outset of the armed conflict with Iraq, the entire frontal zone was divided into three operational regions. To each of these a headquarters is deployed, fulfilling the functions of

forward command post for the ground forces headquarters. Additionally, each operational region has unified ground forces and GCIR operating staffs in wartime to organize the coordination effort between ground force, GCIR and gendarmerie units and other major unit formations.

The headquarters of the operational regions and the unified operating staffs direct the combat operations of subordinate units, participate in the development of operations, plan and organize combat and operational readiness, and address issues of bringing units up to prescribed strength with respect to personnel, combat equipment, ammunition, supply and logistics items.

Western military experts have ascertained that Iran's ground forces are surpassed strength-wise only by the Guards Corps of the Islamic Revolution. However, they transcend the GCIR with respect to armament, organization and level of personnel training.

Organizationally, the ground forces are composed of divisions (infantry, armor, airborne), separate groups (artillery, signal, engineer), and battalions. Army aviation, transportation, construction engineering, rear services and training commands provide for direction of the everyday activities and combat operations of subordinate units and installations. The ground forces are comprised of eight infantry, four armor, and two airborne divisions, a separate armor brigade, an army aviation brigade, five artillery groups, and three separate battalions. Their armament includes more than 1300 tanks (chiefly M47, M60A1 and Chieftain), about 900 field artillery cannon, 1200 mortars and RS30. Anti-tank weapons include TOW and Dragon ATGMs, 57- and 106-mm recoilless guns. Organic air defense is provided by anti-aircraft cannon and "Sokhand-3" missile systems of Iranian manufacture. Army aviation assets include about 66 light aircraft, and up to 400 helicopters. The division is the highest tactical ground-force unit and is similar in structure to the American division.

The **infantry division** is capable of conducting combat operations independently or as a component of groups of forces constituted for a period of time to conduct separate operations. The division includes 3-4 brigade headquarters, 10-12 infantry and 3-4 tank battalions, an artillery headquarters, 4 artillery battalions, reconnaissance, signal, engineer, rear services and medical battalions. Subunits (platoons, companies) have begun being formed in recent times to provide a defense from weapons of mass destruction. Division personnel strength numbers more than 16,000. Its armament includes about 160 light tanks, up to 80 field artillery guns (203.2-, 155-, and 105-mm howitzers), approximately 200 mortars (120-, 106.7- and 81-mm) and 107-mm multiple-launch rocket systems, about 200 106- and 57-mm recoilless guns and ATGM launchers, over 250 anti-aircraft weapons, automatic rifles, machine guns, hand-held anti-tank grenade launchers, other weapons and combat equipment.

The **armor division** consists of a command section; headquarters and headquarters company; three armor brigade headquarters; seven tank, five motorized rifle and one armored cavalry battalion; four artillery and two anti-aircraft artillery battalions; signal, engineer and training battalions; and division rear (a fourth armor brigade is formed in wartime). Division personnel strength can reach up to 16,000. It includes approximately 300 tanks, 400 armored personnel carriers, over 70 field artillery cannon, more than 100 mortars of varying caliber, 70 106-mm recoilless guns, about 30 anti-aircraft weapons, and other armament.

The **airborne divisions**, formed over the course of the Iran-Iraq conflict, are based on two brigades—the 23d special-purpose airborne and the 55th airborne brigades—have the mission of conducting reconnaissance, diversionary and special operations. The main combat subunits of these divisions are the airborne battalions (with three companies each). There are up to 10 such battalions in each division. They are equipped with 105-mm howitzers (up to 30 pieces in each battalion), 120- and 81-mm mortars, and 57-mm recoilless guns. There are no organic means of transporting personnel and combat equipment to areas of combat operations. Assault transport helicopters of army aviation and military transport planes of the air force are usually used to lift reconnaissance/diversionary groups and tactical air assault teams into the enemy rear.

A **separate armor brigade** was formed in 1977 to provide training at the Shiraz tank training center. It includes three armor battalions, a motorized rifle company, armored cavalry troop, mortar battery, anti-aircraft battery, signal and engineer companies, and a technical support/logistics battalion. Brigade strength is about 3500. Its armament includes about 170 tanks, 18 120-mm and 3 106.7-mm mortars, and up to 400 armored personnel carriers and vehicles.

Army aviation is tasked with the mission of dropping assault teams into the enemy rear, airlifting infantry subunits, combat equipment and logistical items, conducting tactical air reconnaissance, providing fire support for first-echelon subunits and assault teams in the enemy rear, effecting command, control and communications, correcting artillery fire, evacuating sick and wounded, laying mixed minefields, and providing materiel and logistics support to units and subunits operating in difficult-access areas. The armament of the 43d Army Aviation Brigade consists of UH-1D Iroquois general-purpose helicopters, AH-1G Huey-Cobra fire support helicopters, CH-47 Chinook, AB-205 and AB-214 transport helicopters. Iranian military specialists learned from the experience of the conflict with Iraq that it was necessary to increase army aviation fire power and enhance its ability to engage enemy tanks. They intend to achieve this by increasing the number of AH-1G fire support helicopters and equipping their forces with helicopters having sophisticated anti-tank systems.

The regulation of ground force strength levels and the conditions under which military service is performed are stipulated in the law on general military duty. The term of service for soldiers and noncommissioned officers is two years. Recruits undergo basic training at training centers and subunits in the main units. Basic training consists of a course 8 to 12 weeks long depending on the general education level of the conscripts. Following basic training the young soldiers are assigned to ground forces units, where they undergo specialized and small-unit coordination training during a 15-day program.

Foreign military experts believe that an important measure related to enhancing ground forces combat capabilities is the formation of so-called "Kods" reserve infantry battalions, constituted chiefly with volunteers and attached to existing units. These consist of 3-5 infantry companies and are equipped only with light small arms. By the beginning of 1987, there were about 100 such battalions in all formed within the ground forces.

According to numerous declarations of Iranian leaders, very serious attention will continue to be devoted in the future to the matter of enhancing the fighting abilities of units and subunits. Whereas at one time Iran was seen to be building up her combat capabilities by virtue of personnel increases alone, the armed forces command is now gradually transitioning to a system of re-equipping its forces with modern armament and combat equipment.

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#### Trends in the Development of Light Armored Vehicles

18010041e Moscow ZARUBEZHNOYE VOYENNOYE OBOZRENIYE in Russian No 10, Oct 87 (signed to press 5 Oct 87) pp 22-29

[Article by Colonel B. Safonov, candidate of technical sciences: "Trends in the Development of Light Armored Vehicles"]

[Text] The 27th CPSU Congress stressed that a major weapon of imperialist aggression and adventurism directed against the Soviet Union and other nations of the socialist community is the North Atlantic bloc. NATO countries are expanding the militarization of their economies, constantly increasing military expenditures, developing various plans for unleashing and waging conflict, and building up their nuclear and conventional armament.

NATO experts consider light armored combat vehicles (LAV) used for a variety of purposes to be a developing form of conventional armament. LAVs can be wheeled

or tracked, amphibious or non-amphibious, carriers of light or relatively heavy armament. NATO standards define the LAV as an armored vehicle weighing up to 25 tons.

Judging from foreign press reports, a significant number of light armored vehicles are presently in the ground force inventories of NATO bloc countries. They include light tanks, infantry fighting vehicles, armored personnel carriers, reconnaissance, command and other vehicles. LAVs comprise about 70 percent of the total number of tracked armored vehicles in the main "heavy" divisions of the new U.S. Army organization. They also occupy a significant position (up to 50 percent) in the ground force units of West Germany, France and Great Britain.

Light armored vehicles play a special role in airborne units, where they are the basic means of transporting personnel on the battlefield and providing fire support.

Foreign experts believe that real possibilities currently exist for significantly enhancing LAV combat characteristics in line with technological achievements. This applies first and foremost to their armament. Automatic, small-caliber cannons have gained widespread use on LAVs for engaging similar light armored vehicles. 20- and 25-mm cannons are most commonly used on serial models. It has been noted in the foreign press that a 20-mm shell with armor-piercing core can penetrate about 25 mm of steel armor plating at a range of 1000 meters. The M242 Bushmaster (25 mm), mounted on the American M2 (Bradley) and M3 armored fighting vehicles and the wheeled (8x8) LAV-25, have better characteristics. Its armor-piercing sub-caliber shell (mass—137 g, muzzle velocity—1335 m/sec) can penetrate almost double the above-mentioned armor thickness at the same range. British light armor vehicles use chiefly the 30-mm Rarden automatic cannon, its combat load consisting of sub-caliber projectiles. The Scorpion light reconnaissance tank is armed with a 76-mm cannon.

Greater caliber (35-, 60-, 75-, 90-, and 105-mm) automatic cannon have also been developed for light armored vehicles. Usually mounted on specially built armored turrets, these cannon are characterized by significant capabilities in engaging armored targets. Thus, for example, the automatic 60-mm cannon developed in Israel and Italy can fire fin-stabilized, sub-caliber projectiles with a muzzle velocity of 1620 m/sec and can penetrate armor plate 120 mm thick, at a 60-degree angle of impact, from a range of 2000 m. The cannon's force of recoil is only 60 kN, enabling it to be mounted on vehicles weighing up to 20 tons. More powerful still are shells fired from the 75-mm automatic cannon made by the U.S. firm ARES.

Low-pressure 90- and 105-mm cannon are presently being used on light armored vehicles intended for employment against tanks. They fire relatively light projectiles, enabling attainment of significant muzzle

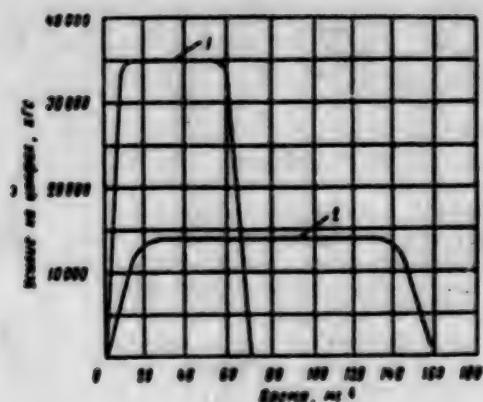


FIGURE 1 Variance of Force on 105-mm Cannon Transitions With Recoil Time

Key:

1. M68 tank cannon with length of recoil 304 mm
2. Low-impulse cannon with muzzle brake
3. Force on trunnions, kg (force)
4. Time, milliseconds

velocity with low barrel pressure and correspondingly low recoil force. These guns are manufactured in Great Britain, West Germany, France and Belgium.

Foreign experts note that prospects for manufacturing a light armored vehicle with a powerful, standardized armament improved significantly when in 1980 the West German firm Rheinmetall began manufacturing a modified, so-called low-impulse 105-mm tank cannon, capable of firing all types of tank ammunition. Its armor-piercing, fin-stabilized, sub-caliber projectiles have a muzzle velocity of about 1500 m/sec. Some of these are reported in the foreign press to be capable of penetrating over 400 mm of armor at ranges of up to 2000 m. The gun's combat load also includes fairly effective HE fragmentation and HE armor-piercing projectiles.

It was previously considered impossible to mount tank cannon on vehicles weighing less than 20 tons because of their great recoil force. Muzzle brakes and significantly increased recoil length were introduced in an effort to reduce these forces. Sharp recoil force reductions in the 105-mm tank cannon (fig 1) have enabled its mounting not only on light tracked armored vehicles, but on wheeled LAVs as well.

Closely related to choosing the basic LAV armament is the question of a fire control system (FCS). In this regard, the conditions of proposed combat utilization of the vehicle are first and foremost taken into account. Thus, rather simple fire control systems are usually employed in LAVs with light machine gun armament. Vehicles equipped with small-caliber, automatic cannon

involve, as a rule, systems with armament stabilization in two planes of position, day and night devices (including heat-visual) for observation and aiming, and other elements associated with integrated fire control systems. Many foreign experts believe that fire control systems for LAVs equipped with effective medium-caliber cannon (including modified tank cannon) should have as good a fire control system as that of main battle tanks, or an even more developed one.

An example of this is the FCS employed on the American HSTV-L enhanced-survivability experimental vehicle, armed with 75-mm automatic cannon manufactured by the ARES firm. A variant of the RDX/LT light tank was developed for the rapid deployment forces based on this vehicle. Two sights are mounted on a single-seat turret (which accommodates the commander), providing television communications with the work stations of the remaining two crew members. The eyepieces for the sights are stabilized. This fire control system enables the commander to search for targets using one sight at the same time that the gunner is firing on a target detected earlier using the other sight. Both sights have television and infrared capability. The commander's sight has an optical channel for direct observation; the gunner's sight has a built-in range finder with carbon dioxide laser. In addition, an auxiliary gunner's sight is mounted on the vehicle body, the eyepiece of which is connected to the gun.

Foreign experts believe that progress with respect to increasing the protection afforded light armored vehicles has been significantly less than that associated with the development of their fire power. This is primarily due to extremely rigid weight limitations imposed by requirements for the vehicles to be air-transportable and, more critically, amphibious.

Until recently, the majority of light armored vehicles had bodies and turrets manufactured of homogeneous, low-carbon, steel armor. Armor-protection components were sometimes made of heterogeneous steel plate with a hard exterior and viscous interior layers. Beginning in the 1960's, armor made of aluminum alloys came into use (the U.S. M113 armored personnel carrier and Sheridan M551 light reconnaissance tank, Great Britain's Fox armored reconnaissance vehicle and Scorpion light reconnaissance tank). The use of such armor effected a certain savings in weight, enhanced construction rigidity and provided high corrosion resistance. Its major drawback was higher cost as compared with steel armor plate.

New, highly durable steels have recently been produced to provide armor protection. These exhibit a Brinell hardness of from 500-550 units, providing LAVs with enhanced anti-small arms and anti-fragmentation resistance. Bodies and turrets of the Stingray light tank, Commando and LAV-25 wheeled armored vehicles (U.S.), and France's M11 armored vehicle are among those manufactured of this steel.

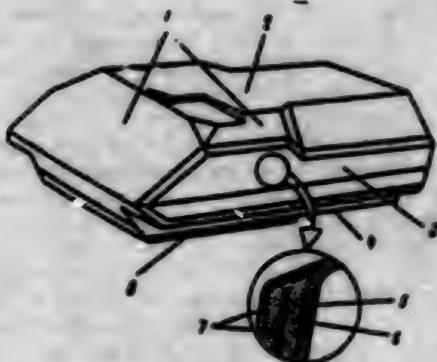


FIGURE 2 Armor Configuration of the M2 Bradley Fighting Vehicle

Key:

1. Armor aluminum alloy 7039
2. Armor aluminum alloy 5083
3. Diverse composite armor
4. Hull floor made of armor aluminum alloy 5089
5. Armor aluminum alloy 7039
6. Polyurethane foam
7. High-hardness steel armor
8. Steel armor cover plate

Foreign press reports note that the use of composite armor can bring about the greatest gain with respect to providing LAV protection while maintaining the prescribed weight limitations. Thus, the carrier body of the M2 Bradley is made from various aluminum armor alloys, while additional armor components made of high-hardness steel (fig 2) are installed in its most critical sections. The composite can be reinforced through the use of highly durable ceramic materials. The internal, armor-enclosed space may be given greater fragmentation protection with Kevlar (polyamide fabric impregnated with special resins) material. Additionally, armor plate made of such material improves sound and heat insulation.

The protection afforded today's light armored vehicles is improved by lowering and decreasing the size of their silhouette, increasing their battlefield mobility, making use of camouflage, and employing smoke grenades and thermal smoke devices.

One highly advantageous characteristic of light armored vehicles is their great mobility along roads and over terrain. In order to maintain desired mobility, firms developing and producing these vehicles prefer to use military modifications of commercial engines, transmissions, and undercarriage components in their production which have been fully developed and assimilated by industry. Examples of this can be seen in the VTA-903T (500 horsepower) diesel engines mounted on the Bradley M2 infantry fighting vehicle and in the 8V-92TA (535 horsepower) diesel engines of the Stingray light tank (engine characteristics are as shown in fig 3). Efforts are also underway to develop gas turbine engines for light

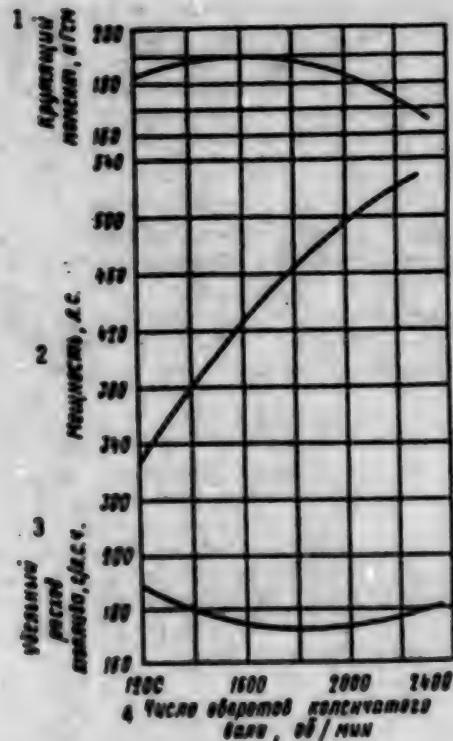


FIGURE 3 External Characteristics of the American 8V-92TA Diesel Engine

Key:

1. Torque, kilogram (force)-meter
2. Output, horsepower
3. Specific fuel consumption, gal/hp-hr
4. Crankshaft revolutions, rev/min

armored vehicles. One such experimental model (650 hp) was mounted on the experimental HSTV-L enhanced-survivability, light vehicle. U.S. experts presently believe, however, that the use of such engines on light armored vehicles would be inadvisable, due to high production costs and low fuel economy.

Mechanical, hydromechanical and electromechanical transmissions are currently being manufactured for wheeled and tracked light armored vehicles. The latest variety of these was mounted on the Belgian Cobra (tracked vehicle). Foreign press reports emphasize that this kind of transmission not only provides the vehicle with high traction and speed, but also renders certain advantages in configuration.

Hydromechanical transmission systems, as a rule, use integrated hydrodynamic transmissions with automatic block clutch. Turn mechanisms in most of the tracked vehicles are of the differential variety. In recent times they have quite often come to have hydro-volumetric transmissions in their auxiliary drive, enabling non-stepped regulation of radius of turn. Full-drive wheeled

LAVs sometimes employ the turning principle of tracked vehicles: the turn is effected by imparting diverse rotation speeds to the right and left side wheels. This makes it possible to eliminate deep niches for the controlled wheels and gain useful volume capacity in the vehicle body (the French AMX-10RC armored reconnaissance vehicle).

It is characteristic of the NATO light armored vehicles that a successfully developed design usually becomes the basis for producing an entire family of various-purpose vehicles. An illustrative example would be the American M113 armored personnel carrier (of which more than 70,000 have been manufactured and are found in the army inventories of over 40 countries). British and French light armored vehicles have been widely used as base vehicles. The West German firms Krauss-Maffey and Dichl have recently developed the new "Puma" LAV as a base vehicle for producing more than 10 vehicles for a variety of purposes, including command and control, reconnaissance, maintenance and repair, infantry fighting vehicle, armored personnel carrier, light tank (with 90- or 105-mm cannon), self-propelled anti-aircraft weapons systems, self-propelled anti-tank rocket systems, 120-mm mortars.

At the beginning of the 1980's, the NATO countries—especially the United States—increased their interest in light armored vehicles in connection with the advent of rapid deployment forces. The main requirements to be met by armored vehicles intended for use with these forces are air-transportability and sufficiently great fire power.

Four American firms have recently built their versions of experimental models of light tanks for submission to the U.S. military leadership in connection with the selection of one such tank for use with the rapid deployment forces. Their chief tactical and technical features are as shown in the table.

The RDF/LT (Rapid Deployment Force/Light Tank) is an improved model of the experimental HSTV-L enhanced-survivability vehicle, developed at the end of the 70's by AAI Corporation. It is characterized by a low silhouette and great angle of incline of the upper front body plate (made of aluminum armor). A 75-mm automatic cannon manufactured by the ARES firm, stabilized in two planes of position, is mounted on the 360-degree traverse, single-seat turret. Its basic combat load consists of sub-caliber projectiles with fin-stabilized, armor-piercing core. The fire control system includes laser range finder and electronic, ballistics computer. The eyepieces of the gunner's and commander's sights are stabilized. There is an infrared system for forward observation and scanning. The gun's great angle of elevation enables engagement of air targets. The body of the tank can be reinforced with steel armor to provide

increased protection. The power unit is located in the rear of the vehicle. The diesel engine is built in a single block with the automatic transmission. The vehicle has torsion suspension.

The Stingray light tank was built in 1984 by the Cadillac Gage company. It has a classic configuration. Components and assemblies of earlier armored vehicle models were widely used in effecting its design and construction. The tank's body and turret are made of steel armor plate.

As noted in the foreign press, the Stingray tank is comparable to the M1 Abrams with respect to fire power and mobility. Its main armament is the British low-impulse, 105-mm rifled cannon. Its force of recoil is almost halved by virtue of new anti-recoil devices and a muzzle brake. The gun is stabilized in two position planes. Day and night sights for gunner and commander are included in the fire control system.

A high degree of mobility is provided through the use of a powerful diesel engine. The vehicle has a torsion suspension with hydraulic shock absorbers on the first and last bogie wheels. The steel track pins have detachable rubber pads.

In 1985 Food Machinery and Chemical Corporation built an experimental model of the CCVL light tank (Close Combat Vehicle Light). Its armament, a low-impulse, 105-mm, rifled gun developed by the West German firm Rheinmetall, is capable of firing every regulation 105-mm tank projectile, including sub-caliber shells with fin-stabilized, armor-piercing core. It has armament stabilization in two planes of position for conducting precision fire on the march.

The forward body assembly of the CCVL light tank is similar in design to that of the Bradley M2 armor and is a combination of steel and aluminum armor plate. The turret is welded and also fashioned of composite armor plate, affording protection from small arms fire and artillery shell fragmentation. It has been reported that additional armor protection can be provided, to include "active armor" plate, capable of countering shaped charges fired from anti-tank rocket launchers.

The tank has an automatic loading system, located at the left rear of the asymmetric turret. The gunner and commander are positioned in tandem to the right. The automated loading system is iterative and enclosed, programmed for 19 rounds. A non-permeable partition separates it from the personnel compartment. The loading cycle is completed in five seconds. Replenishment of ammunition stowage is accomplished by the driver-mechanic. The gun may be loaded manually by the commander or gunner using a hatch in the roof of the turret.

The tank has a modern fire control system. Mounted near the gunner is a heat-visual day/night sight with laser range finder, stabilized in two position planes, and an

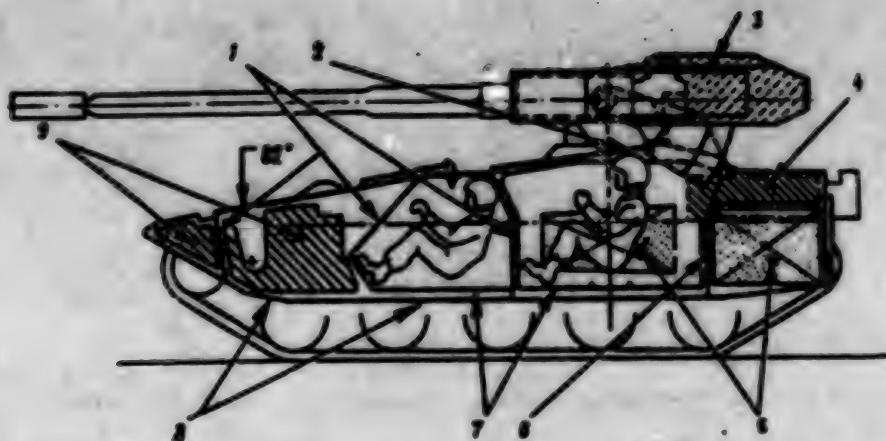


FIGURE 4 Layout Configuration of the AGS Light Tank

Key:

1. Power compartment partitions
2. Crew hatches
3. Remote armament
4. External fuel tank
5. Ammunition
6. Partition
7. Double hull floor
8. Automatic fire extinguisher system
9. Explosive-proof fuel tanks

auxiliary sight. The commander also has an infrared, stabilized, day/night instrument manufactured by the Hughes Corporation, which provides panoramic scanning and observation throughout a 360-degree sector. When this device is not in use, it is lowered like a periscope into the turret. The commander's and gunner's instruments are inter-connected. The control drives for turret and gun and the digital ballistics computer are modifications of those components as found in the M1 Abrams tank.

The CCVL light tank is distinguished by virtue of high mobility (maximum road speed: 70 km/hr). Its six-cylinder diesel engine is fashioned in a single block with the hydromechanical transmission. The undercarriage has a torsion suspension. The CCVL may be transported by C-130 or C-141 military transport aircraft and air-dropped from low altitudes using a special parachute system for freight drops.

In 1985 Teledyne Continental Motors produced its own variant of light tank for the rapid deployment forces. This came to be known as the AGS (Armored Gun System), a highly mobile, air-transportable armored vehicle with relatively powerful armament (the same M68A1 105-mm rifled cannon as is found on the M60 and M1 tanks, but with modified anti-recoil devices and muzzle brake). The gun is stabilized in two position planes.

The basic difference between this light tank and the models previously mentioned is its configuration with remote armament. An automated mechanism manufactured by the ARES firm is used to load the cannon. This consists of a magazine (9-shell capacity) and two drums (10-shell capacity each). Shells are fed from the drums into the magazine. The remaining 11-16 shells are situated in the vehicle body. Various types of projectiles were used during test firings, to include the armor-piercing, sub-caliber M735.

A number of design recommendations were implemented in the AGS light tank aimed at increasing its survivability. These involve mainly a new configuration (fig 4) providing for fuel and ammunition separation from the personnel compartment using a non-permeable partition, ammunition storage in the lower rear portion of the body, rather low positioning of the crew members, and additional protection for the driver-mechanic using components of the engine and transmission systems. In order to enhance the vehicle's resistance to mines, the hull floor is made in composite fashion—two aluminum armor plates separated by filler—and the driver's seat is displaced to the rear behind the first bogie wheel. The vehicle body is made of aluminum armor, with additional steel and ceramic armor reinforcement for the most critical parts, and Kevlar panels. The upper front plate has a very great angle of incline (62 degrees). The sides of the vehicle are covered with steel skirting.

Model designation	Combat mass (tons)		Dimensions (m) height length x width	Caliber of armament (mm) cannon machine gun	Combat load shells ammunition	Engine output (hp)	Maximum speed (km/hr)	
	GPM	TOW					7000	7000/1000
ADF/LT	13.0	—	2.23 1.97 x 2.04	76 7.62	60 3000	350	64	500
Stingray	19	—	2.35 1.97 x 2.07	105 7.62 and 12.7	35 3000 or 11000	535	70	400
CCV	19.4	—	2.33 1.97 x 2.05	105 7.62	63 3000	512	70	400
AGS	19	—	2.34 1.97 x 2.05	105 7.62	50-55 3000	500	64	400

TABLE I Tactical-Technical Characteristics of Experimental Models of American Light Tanks

This vehicle uses the Diesel engine and transmission of the M2 Bradley infantry fighting vehicle (mounted in a single block in the forward body) as well as certain undercarriage elements of the M109 self-propelled howitzer. The vehicle has hydro-pneumatic suspension.

The commander and gunner are positioned in a low-profile turret in front of the gun assembly. They are equipped with all necessary observation and aiming devices and a common control console is positioned between them. The vehicle's modern fire control system includes a heat-visual sight with laser range finder, auxiliary perisopic sight with optical channels for gunner and commander, and a digital ballistics computer. In addition, the FCS may include a television camera capable of being mounted on any side of the gun mount, its images monitored on a screen by the vehicle commander.

It has been noted in the foreign press that, in developing light armored vehicles for the rapid deployment forces, much attention has been devoted to providing a high degree of operational reliability and repairability. Automated electronic diagnostics monitoring systems are mounted on them with this in mind, enabling necessary information to be gathered concerning the operation of vehicle systems and mechanisms. The engine and transmission mounts are manufactured in a single block, as a rule, allowing for their relatively swift and easy replacement under field conditions. They also have special equipment to facilitate servicing and repair.

The United States and the other NATO countries are attempting to mount 105-mm tank guns with small recoil force on wheeled LAVs as well. The American Cadillac Gage corporation put this cannon on several experimental models of V-300 and V-600 "Commando" armored vehicles (6x6), and the Italian firms OTO Melara and Fiat are mounting it on a variant of wheeled (8x8) LAV. A 105-mm tank gun has also been mounted on a Swiss experimental wheeled armored reconnaissance vehicle, the Shark. It is the opinion of foreign military experts that these light armored vehicles may be employed

basically for conducting reconnaissance, insofar as they are not as standardized a form of combat equipment as tanks, in spite of their powerful armament.

Judging from foreign press reports the NATO countries are continuing their efforts to perfect existing light armored vehicles and develop new ones for various missions. The newest acquisition technology is being employed in this regard. In addition to delivering LAVs to their own armed forces, corporations engaged in their production are planning to sell significant quantities to other nations, the developing countries in particular.

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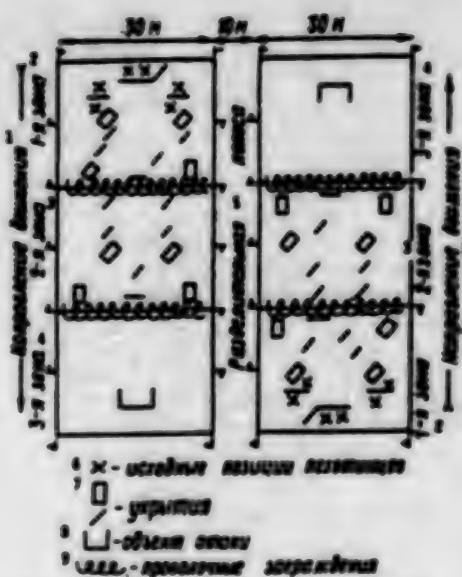
#### Miles Laser Firing Simulator in U.S. Army Training

18010041f Moscow ZARUBEZHNOYE VOYENNOYE OBOZRENIYE in Russian No 10, Oct 87 (signed to press 5 Oct 87) pp 29-31

[Article by Lieutenant Colonel I. Aleksandrov: "The Miles Laser Firing Simulator in U.S. Army Training"]

[Text] In efforts to improve existing forms and methods of training servicemen and develop new, more effective ones, the U.S. Army strives during the course of the training process to create conditions which realistically reflect the battlefield environment. As noted in the foreign press, however, battlefield conditions have always been related to problems caused by the nature and extent of enemy activity. The introduction of modern technology into the training process enables this problem to be resolved more satisfactorily.

Since the beginning of the 1980's, the U.S. Army has been using the "Miles" laser firing simulator in its combat training, a device which facilitates determination of combat engagement results on personnel or combat equipment. Its principle of operation is as follows. A laser emitter is mounted in front of the muzzle



**FIGURE 1** Layout for Team Competition Using the Miles Flying Simulator

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1. Direction of movement
  2. Zone 1
  3. Zone 2
  4. Zone 3
  5. Partitioning strip
  6. Team start positions
  7. Cover
  8. Objective
  9. Barbed-wire obstacles

face of an organic weapon (the M16A1 rifle, for example) which emits an impulse or series of impulses, depending on whether a single blank cartridge or a burst is fired. Detectors are affixed to an infantryman's personal gear or to combat equipment which, upon reception of laser emissions, register (by sound or light signal) a "hit" at a range of 500-3000 meters, depending on the type of weapon. (For more detailed discussion on the operating principle of the Miles simulator see *Zarubezhnoye voyennoye obozreniye*, 1985, No 12, pp 43-48). The Miles firing simulator can now be mounted on small arms, artillery, armor and anti-aircraft armament. The U.S. military believes that outfitting regular army units with the device will facilitate more effective combat training. According to foreign press reports, the most effective laser firing simulators are currently being used at the U.S. National Ground Forces Training Center, Fort Irwin, California, where two-way tactical battalion exercises are conducted using simulated engagement and strike techniques during the course of scheduled combat training for mechanized infantry and armor battalions.

The 3d Armored Division, stationed in West Germany, is taking advantage of the use of simulators in training personnel for close combat. A program has been developed here for conducting exercises in the form of a

sports-oriented competition ("games"), organized in the following manner. A sector of terrain 100 by 70 meters is prepared in two lanes (each 100 by 30 meters) along with a 10-meter partitioning strip (see diagram). Each lane is divided into three zones with barbed wire obstacles. The first and second zones contain cover and concealment, the third—an enemy objective (firing position). Any materials or objects may be used to provide cover and protection from the laser emissions (barrels, boxes, boards, etc.). Two teams, each comprised of six fully-equipped soldiers (the number of infantrymen in an assault team in the Bradley M2 infantry fighting vehicle), participate in the "game." Each team is armed with an M60 machine gun and five M16A1 rifles. The combat load consists of 400 blanks for the machine gun and 1000 for the rifles (200 per weapon), five training hand grenades and one smoke grenade.

The teams take up corresponding positions at starting points on opposite ends of the training area. The soldiers may begin "combat operations" in two ways: from concealed positions or in infantry fighting vehicles. A simulated artillery burst signals the start of the "game," after which the teams move out in each other's direction but staying in their own lanes. The men "fire" at the "enemy" and use various methods of maneuver to get from one concealed position to another, striving to move through their lane while suffering the least number of casualties and destroy the enemy objective. Ten minutes are allocated for the exercise.

Special rules are drawn up for conduct of the exercise, the principal ones being as follows: team members must operate only in their assigned lane; any "live" team member may replace a "dead" machine gunner; the smoke grenade may be used only in one's own lane or the partitioning strip; "live" team members may pass ammunition to one another during combat, or take ammunition from "dead" personnel (but without their assistance); "dead" team members must take off their helmets and observe the exercise while remaining in place.

Referees, usually a platoon leader and his assistant, are designated to enforce exercise rules. They monitor the soldiers' activity during the "combat" and calculate the results. They carry M16A1 rifles with laser emitters which they may use to penalize team members who break the rules. If, for example, a "dead" infantryman attempts to make contact with someone, the exercise director or his assistant "kills" the team member closest to him. Team members who go outside their assigned lanes, to include into the partitioning strip, are penalized in similar fashion.

A five-point system is used to determine the victors. Points are awarded in the following manner: one point for each man who reaches the first barbed wire obstacle; two points for successfully negotiating it; three for each individual crossing the second obstacle; five for every

grenade which accurately strikes the enemy firing position. Points may also be withdrawn from participants, one at a time, for infractions such as throwing a smoke grenade into the other team's lane, moving outside one's assigned lane, etc.

American military experts note that introducing the sports-competition element and demonstrational aspect into infantry exercises enables commanders to enlist the participation of personnel from other units, to benefit from their observation and critique. It is emphasized that a valuable aspect of this type of combat training is to be seen in the enhancement of professional qualities, such as the ability to conduct precision fire, to maneuver on the battlefield under enemy fire, throw grenades and lay down smoke screens. It facilitates the development in servicemen of a will to win, composure, cunning, skill, dexterity and the will to survive. In the opinion of Western experts, the results of these exercises have already enabled a number of conclusions to be drawn with respect to the tactics of small-unit operations. It was found, for example, that commanders positioned behind their men became "casualties" more frequently than those who moved alongside, or even in front of them. Additionally, the exercises have shown that conditions of rapidly developing close combat require a great deal of attention to be paid to the organization of mutual support and cooperation among the men, to coordination and direction of their activities.

The U.S. military establishment believes that use of the Miles laser firing simulator in training ground forces personnel can significantly enhance their level of training, small-unit coordination and overall readiness to conduct combat operations.

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Tactical Aviation in Contemporary Operations  
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[Article by Colonel V. Kondratyev: "Tactical Aviation in Contemporary Operations (The Views of U.S. and NATO Military Experts)"]

[Text] The first part of this article (see Zarubezhnoye voyennoye obozreniye, 1987, No 9, pp 29-36) briefly examined doctrinal principles and concepts adopted by NATO for waging war, the organization and fighting strength of combined NATO air forces in the Central European theater, and the role and missions they are assigned in contemporary operations.

The continuation presented here states the views of certain NATO military experts, as reported in the foreign press, on the forms and methods of utilizing its tactical aviation assets during the course of combat operations.

It has been reported in the Western press that the forms and methods of utilizing tactical aviation are determined, as before, by the "NATO air doctrine" adopted in 1976, a special document containing unified principles on combat employment of the bloc's combined air forces and air defense assets in the European theaters. In accordance with this doctrine and subsequent NATO directives, the main form of tactical air combat operations consists of air operations which are categorized, in Western terminology, as offensive, defensive and special.

Offensive air operations. The purpose of such operations is to effect destruction of enemy air and air defense assets, gain air superiority, and destroy groupings of enemy ground forces over their entire depth—including second echelon and reserve forces—while sealing off areas of combat operations and providing air support to friendly forces. NATO military experts believe that accomplishment of these missions requires a concentration of major combat air forces and the involvement of ground forces assets. All these forces and resources must operate under centralized direction and must effect closer time and place coordination than before.

Offensive air operations are directed by the commander-in-chief of NATO's combined armed forces in the Central European theater through the commander of the combined air forces. Responsibility for planning, preparation and the conduct of operations is entrusted to the commanding generals of the 2d and 4th ATAF (Allied Tactical Air Force). The depth of these operations can reach 1000 km, width: 700-800 km. Its duration can be three days or more.

Offensive air operations may be conducted at the outset or during the course of the war, either independently or within the framework of strategic operations in the theater. It is envisaged that assigned air missions will be accomplished by inflicting two or three massive strikes along several axes. Specifically, exercises of NATO's combined armed forces in the Central European theater involve the delivery of such strikes along two main axes: by 2d ATAF forces in the north (in the sector of the Northern Group of Forces) and by 4th ATAF in the south (Central Group of Forces sector).

The greatest possible number of aircraft and other assets is planned to be used in conducting the first massive strike. As noted in the foreign press, only certain alert forces (nuclear weapons carriers, those air defense fighters designated for repulsing a retaliatory strike), certain

strike aircraft in reserve (tactical fighters and ground attack aircraft) with conventional weapons, and non-combat ready (for whatever reason) aircraft will remain inactive.

Western press reports note, with regard to this question, that the number of combat aircraft in a single allied tactical air force can, upon reinforcement, reach 1300-1500, of which 1000-1200 may participate in the first massive strike.

The first massive strike is intended to breach enemy air defense systems along several axes and inflict maximum possible damage on groupings of enemy armed forces, primarily his air and air defense forces, and to disrupt their command and control. In this regard, the main tactical air effort is designed to attain air superiority by destroying enemy aircraft on the ground and in the air, knocking out enemy airfields and air defense complexes in position, destroying his warehouses, supply bases, command posts and other command and control elements. Part of the tactical air forces are designated to provide air support to the ground forces and seal off the area of combat operations, i.e., accomplish missions in accordance with "deep strike" concepts.

The purpose of subsequent massive strikes is to attain complete air superiority and, upon achieving this, inflict maximum damage on enemy ground forces on the battlefield, and on second echelon and reserve forces in his tactical and operational depth, with the aim of denying their entry into the conflict. Simultaneous operations are planned to curtail enemy restoration efforts at airfields and other important facilities struck in the initial air attacks.

Subsequent massive strikes are to be conducted as necessary, and the distribution of forces to accomplish specific tasks will depend the results of previous operations. Simultaneously with the infliction of the massive strikes and during the intervals between them, it is planned to use some of the NATO combined air forces in the Central European theater to accomplish other missions: conducting air reconnaissance for subsequent friendly air and ground force operations; repulsing enemy air attacks; conducting air transport of troops and cargo; supporting air drops, air landings and air assault operations.

The air tactical order of battle for the massive ATAF strikes along the main axis has been developed in exercises of the combined NATO air forces in the Central European theater, and consists of two echelons: air defense breakthrough echelon and strike echelon.

The air defense breakthrough echelon has the mission of suppressing enemy air defense forces and weapons systems in the flight path taken by the main strike echelon to reach its strike objectives (width of the breakthrough zone can reach up to 120 km, depending on the situation). It may comprise 100-120 aircraft, of which about

60 percent are strike aircraft (tactical fighters and ground attack aircraft), about 30 percent are escort fighters, and up to 10 percent are electronic warfare (EW) aircraft.

The strike aircraft of this echelon are tasked with the mission of destroying enemy fighter aviation, anti-aircraft complexes and air defense artillery, eliminating his radar facilities, first and foremost the control radars for his fighter aircraft, air defense missile and anti-aircraft artillery. In order to accomplish this mission, these groups of strike aircraft have—in addition to fighter-bombers and ground attack aircraft with conventional weapons—aircraft armed with anti-radar missiles, to include F-4G Wild Weasels specially adapted for the mission.

Escort fighter groups are tasked with the mission of protecting strike aircraft from enemy fighters. These consist primarily of air battle fighters and multi-purpose tactical fighters armed with air-to-air guided missiles.

EW aircraft are at this time conducting active and passive jamming and interference measures against the radio-electronic equipment of enemy air defense systems to reduce their effectiveness. In this regard they may operate independently from airspace above friendly territory, or as part of the tactical air group order of battle.

According to foreign press reports, the strike echelons may include up to 700 various-purpose combat aircraft. Their core is comprised of F-111, Tornado, F-15, F-16 and F-4 tactical fighters; Jaguar, F-104G and Harrier-GR.3 fighter-bombers; A-10, Alpha Jet and A-7D ground attack aircraft; RF-4 and Jaguar tactical reconnaissance aircraft; EF-111, F-4G and Canberra electronic warfare aircraft; F-15 and F-4 escort aircraft.

The strike echelon is tasked with the following main missions: achieving and maintaining air superiority; destroying or attenuating groupings of enemy ground forces over the entire depth of their order of battle, including second echelon and reserve forces prior to their entry into the conflict; providing air support to friendly ground forces on the battlefield.

NATO combined forces exercises in the Central European theater show that the strike echelon may include up to 500 combat aircraft tasked to inflict strikes on various ground targets; 100-120 escort fighters, a portion of which, in addition to their main mission of protecting strike groups from enemy fighter attack, may be used as necessary to seal off airfields stationing enemy fighters; about 50 reconnaissance aircraft for conducting final pre-strike reconnaissance of known targets and uncovering new ones, as well as determining strike results; 15-20 EW aircraft tasked with conducting active and passive jamming and interference against enemy radio-electronic equipment.

The air defense operation is considered by the military leadership of the U.S. and its NATO allies to be an important form of combat operation for air force and air defense forces (it is sometimes referred to in the Western press as the anti-air operation). The NATO combined armed forces headquarters in Europe believes the air defense operation will be conducted under conditions in which the enemy has forestalled the NATO air strike or has temporarily taken the initiative in air operations.

The purpose of the air defense operation is to effect timely detection of enemy air assets (using ground-based radar facilities and distant early warning and control aircraft), provide warning and notification to the command, repulse the air attack with alert forces and simultaneously bring the remaining NATO forces to the highest state of combat readiness. Information is analyzed to determine the direction of the main enemy attack, his intentions and the strength of his participating combat forces. Coordinated operations on the part of all air defense resources are then conducted to effect enemy destruction.

NATO directives on the combat employment of tactical aviation, ground and air defense forces state that the main purpose of this operation is to defend from air attack groupings of friendly forces, important military facilities, economic and administrative centers, communications facilities, and other infrastructure elements; to frustrate enemy plans for attaining air superiority; and, most importantly, to gain air superiority and use it to create conditions favorable for friendly air and ground forces, enabling them to effect transition to decisive offensive operations. Judging from foreign press reports, the scope of such an operation is determined by the quantity and quality of forces and weapons systems used by both sides in the combat operations, and by the nature of the mission and the situation which has evolved.

Within the framework of the Central European theater, such operations are envisioned as being carried out by the combat forces and resources of combined, in-theater air forces, the U.S. 32d Army Air Defense Command (Europe), other air defense missile units of the Northern and Central groups of forces, as well as certain NATO distant early warning and control elements, NATO AWACS (for more detailed information see the first part of this article in the previous issue).

Overall direction of this operation is entrusted to the commander-in-chief of NATO combined armed forces. Direct command is exercised by the commander of combined air forces in the Central European theater (who is simultaneously the commander of forces and combat resources of the Central Air Defense Region).

Exercises indicate that air defense forces and combat resources in the Central European theater are comprised of two echelons.

The first echelon consists mainly of army anti-aircraft missile and artillery systems (surface-to-air missile systems, self-propelled anti-aircraft systems, etc.), many of which are limited in range and altitude and, as a rule, lack a reliable system for identifying air targets. It is the opinion of Western experts that the range of visual identification of combat aircraft under conditions which exist in the Central European theater usually does not exceed 3-5 km. The use of infrared equipment increases the range to just 5-10 km. Coordination between fighter air and the active air defense army assets is therefore planned through the use of zones of responsibility, determined with respect to area and altitude. It has been reported in the foreign press that fighter aircraft operating in the FEBA will conduct combat operations at altitudes greater than 3000 m.

The second echelon consists of two air defense missile zones. The Improved Hawk missile system is employed in the first (30-100 km from West Germany's eastern border). The Nike Hercules and Patriot missile systems have greater range and are employed in the second air defense zone, 80-300 km from the border.

Air defense fighter aircraft are intended to be used outside the engagement zones of the missile systems mentioned above. In certain sectors it is possible that air defense missile units and fighter aircraft will provide mutual support in a single zone. It is the opinion of many Western experts, however, that this is limited greatly by the tactical and technical characteristics of Improved Hawk and Nike Hercules. Conditions for successfully organizing such mutual support improve noticeably with employment of the Patriot system.

The NATO military command believes that the defensive air operation in the Central European theater will take place in two stages.

It is envisaged that the first stage will last from 3-12 hours and will entail repulsing the air attack with air defense forces followed by the employment of tactical fighter units. Simultaneously with increased efforts to combat the enemy air threat, the operation also entails the conduct of tactical air strikes on airfields, air force command posts and other enemy targets so as to attenuate his air forces and constrain his operations.

The main strike aviation forces enter the conflict in the second phase (24 hours and longer). In a role of mutual support with the air defense forces they will repulse the enemy air attack. Concentrating their effort along the main sectors, they will destroy enemy aircraft in the air and on the ground, knock out enemy airfields, command and control points, ammunition storage depots and POL stores. It is planned at the same time to effect measures for rebuilding and restoring friendly air force and air defense facilities knocked out of action.

With regard to questions of fighter aircraft tactics in combat operations, it is noted in the foreign press that the NATO combined air force command gives preference to aircraft armed with short-range air-to-air guided missiles and onboard cannon. The main form of their combat employment is considered to be high-maneuver, close-air combat, since enemy aircraft will be operating primarily at low altitudes. In view of the large number of aircraft occupying the airspace and the use of electronic warfare measures, detection and identification of air targets cannot be guaranteed, and the use of intermediate and long-range missiles may be sharply curtailed. Combat employment of the latter is intended over enemy territory or when friendly assets are protected from air strikes, located in deeply defended territory. Heavy F-15 or F-4 fighters are expedient in this regard, while the lighter F-16 aircraft are advisable for short-range missile employment.

Considering that successful conduct of the defensive air operation must create conditions favorable for a transition to the offensive air operation and activation of friendly ground forces, the NATO command is striving to enhance the effectiveness of air defense in general, and of air defense assets in the Central European theater in particular. With this in mind, measures are being taken to improve ground and air-based radar detection and control systems. The aging Nike Hercules guided missile system is being replaced by the new Patriot complex. Problems associated with increasing the reliability of the Identification Friend or Foe (IFF) system are being resolved. Wartime capability to provide effective air defense of friendly facilities is growing due to more widespread use of modern short-range missile systems. More all-weather fighters are being produced. A great deal of attention is also being devoted to increasing combat readiness in fighter aviation and air defense missile units tasked with defending the Central Air Defense Zone.

Special air operations are planned for accomplishing isolated missions. As a rule these are a component part of the offensive and defensive operations described above. NATO military experts consider combat support missions and the airlift of troops and cargo as falling in this category.

Operations of the latter variety are conducted in support of maneuvering forces and air assault teams and provide them the necessary supply and logistics. Exercises indicate that these missions are accomplished by military transport aircraft and helicopters, as well as tactical aviation aircraft. The former transport personnel and supplies; the latter guarantee their operation.

The scale of these operations depends on the composition of troops or airborne assault teams being airlifted, amount of cargo, location and size of the loading and unloading areas, means of delivery (parachute drop or landing), and the degree of enemy activity encountered.

In connection with providing combat logistics support, tactical fighters conduct an air reconnaissance of the routes to be taken by military transport planes and helicopters, and of the areas where landings or drops are planned. They clear the airspace and suppress ground-based enemy air defense systems. They protect friendly transport aircraft from air strikes and provide direct air support. They isolate the areas in which assault forces will be operating.

Exercises conducted by NATO combined air forces in the Central European theater show that special operations of this type (especially large-scale operations) may involve heavy military transport as well from the U.S. Air Force Military Airlift Command (MAC). During the course of a certain Reforger exercise conducted as part of NATO's Autumn Forge combined forces maneuvers, for example, 20 C-141B Starlifter strategic transport aircraft took off from Pope Air Force Base, North Carolina, and flew non-stop from the United States to Western Europe and back. These aircraft dropped about 1100 men from the 82d Airborne Division onto West German territory along with 27 heavy-cargo platforms holding weapons and equipment. The flight took 21 hours. Each crew accomplished air refueling three times from KC-135 and KC-10 tanker aircraft.

NATO considers combat support to include air force unit operations with respect to air reconnaissance, electronic warfare, air refueling, search and rescue (downed crews), airdrop and evacuation of commando units, laying minefields, etc.

Western experts believe that air reconnaissance should be conducted during peacetime as well as wartime, on a continuing basis. U.S. and NATO armed forces devote a great deal of attention to it, considering it one of the most important forms of providing combat operations security to the ground forces, tactical aviation and naval forces. General E. Eimler, commanding general of the West German Air Force, called air reconnaissance "NATO's offensive potential," since the effectiveness of utilizing the strike power of NATO combined forces in operations of any scale depends greatly on its results. In this regard, the air force can operate independently or in conjunction with army aviation.

Specifically, in supporting the ground forces within the framework of the "airground operation (battle)," tactical air reconnaissance aircraft accomplish their mission in close cooperation with army reconnaissance helicopters and other ground force reconnaissance resources. Their chief mission is to obtain information about the enemy on the battlefield and in his tactical depth in the interest of organizing ground force combat operations, and directing strike aircraft, helicopters and other systems in destroying discovered targets.

NATO combined armed force exercises in the Central European theater show that 15-25 reconnaissance aircraft may be shifted from tactical air to army aviation missions as described above, i.e., up to 10 percent of all tactical aircraft assigned to this mission.

The chief task of air reconnaissance is to provide the command timely, critical information on the enemy, especially with respect to troop concentrations and movements within his operational depth (up to 500 km and greater). This makes it possible to discover enemy intentions and inflict timely strikes on his second echelon forces and forward moving reserves prior to their entry into the conflict.

Air reconnaissance missions in the Central European theater are assigned to RF-4, Mirage-SBR, Jaguar-GR.1 and TR-1 reconnaissance aircraft units. Additionally, crews of fighter-bomber, ground attack, and other types of aviation will also conduct air reconnaissance. Even in peacetime, therefore, different types of aviation undergo training outside the sphere of their specific mission area, oriented towards conducting spontaneous air reconnaissance during prime missions as well as special reconnaissance missions. As noted in the foreign press, a significant portion of NATO tactical air assets has been adapted so as to be able to carry suspended containers with reconnaissance apparatus. The most experienced crews are trained to conduct reconnaissance and final-reconnaissance missions prior to effecting air strikes.

Air force tactics of the Western capitalist states in recent years has widely espoused the principle: "If you see it, shoot it." In this regard, when reconnaissance and tactical fighter crews conducting reconnaissance missions uncover an important target, especially a mobile one, they must strike it with the aim of destroying it or preventing its maneuver until strike aircraft arrive. A number of practical measures are being undertaken in the NATO countries to more effectively implement this principle. Specifically, efforts are underway in the United States to build special reconnaissance-strike systems, and the West German Air Force is modernizing its RF-4E reconnaissance aircraft so as to expand its combat capabilities for destroying a variety of ground targets.

In summarizing the role and mission of air reconnaissance in light of the requirement to "combat second echelon (reserve) forces," it has been noted in the foreign press that special attention must be devoted to areas in the enemy's operational defensive depth. It is stressed that if NATO's combined air forces have accurate data as to the massing and regrouping of forces in the enemy's defensive depth, they will be able to inflict not only material losses and damage but also interfere directly with his operations, i.e., interrupt his operational-strategic planning.

Control of air force and air defense forces. It has been emphasized in the Western press that combat operations in Europe, especially in the Central European theater, will be conducted with great intensity in a rapidly changing environment. In addition, the air force and air defense forces will accomplish their combat missions in the same air space, using the same command and control

systems. In view of this, the NATO military leadership has reached the conclusion that it must concentrate direction of air force and air defense operations in a single element.

Specifically, as has previously been mentioned, the commander of NATO combined air forces in the Central European theater is simultaneously the commander of the NATO Central European combined air defense region. His main elements of command and control, his fixed and mobile command posts, are in the same locations as corresponding command facilities of the commander-in-chief of NATO's combined armed forces in the theater. Command and control of air defense forces and assets is accomplished through a zone operations center. Subordinate to it are the operations centers of the regions and sectors, early warning and control elements, control and reporting posts, radar stations. Aviation command and control elements and air-ground force coordination centers are comprised of operational air support centers, tactical air control teams and forward air controllers. Foreign experts believe that effectiveness in controlling tactical aviation and air defense forces and resources increased significantly after a special early warning and control command, the NATO AWACS, was deployed in Western Europe. The core of this command is comprised of 18 E-3 aircraft.

The views of the NATO command outlined above concerning the use of tactical aviation for combat operations in Europe are clearly offensive in their orientation, a factor which once again testifies to the aggressive aspirations of this imperialist bloc.

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9768

**Guidance Systems for Air-to-Air Guided Missiles**  
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[Article by Colonel V. Sapkov, candidate of technical sciences: "Guidance Systems for Air-to-Air Guided Missiles"]

[Text] Gaining air superiority, one of the basic missions of fighter aviation, depends not only on the tactical and technical characteristics of aircraft and flight crew expertise, but also on onboard weapons systems, including air-to-air guided missiles. Long, intermediate and short-range air-to-air missiles currently in foreign inventories use the proportional guidance method, for the most part, for guiding the missile to target, and are equipped with infrared or radar homing devices.

Long-range missile guidance systems. The American AIM-54 Phoenix missile appears in a variety of modifications and has a range of over 100 km. It is the only

missile of its kind in use abroad. The AIM-54A has a composite guidance scheme, a semi-active radar, impulse-Doppler system. It uses the aircraft's radar signals reflected from the target for the initial and intermediate trajectory segments and the active radar, impulse-Doppler homing system when the missile comes within 16 km of the target. It is believed that homing guidance enables target engagement from front or rear, under favorable or adverse weather conditions.

According to foreign press reports, instead of the guidance apparatus with automatic pilot with which the AIM-54A and B are outfitted, the U.S. has installed a command-inertial guidance system on its AIM-54C missile based on a digital computer—which also functions as an automatic pilot—and supplementary hydrostabilized platform. American experts assert that this type of guidance system can provide more complicated, optimal trajectories, can enhance engagement effectiveness against high-altitude and highly maneuverable targets, and can increase the accuracy with which the missile is placed into its final flight segment, from which it effects transition to the homing mode. In addition, the digital, command-inertial guidance system increases (approximately doubles) the reliability of onboard equipment, and built-in automatic monitoring devices allow reliability to be checked independently of the weapons guidance system for the F-14 Tomcat carrier.

Instead of the existing homing head transceiver based on a klystron, a new transceiver was developed for the AIM-54C based on semi-conductor components, which operates in a linear modulation frequency mode. This improvement is believed to have led (due to more complex signal processing and the ability to discriminate among reflected signals and identify the nature of the target) to increased missile effectiveness when firing in pursuit, at group targets, and at targets with intersecting flight paths. The new transceiver has means of compensating for aberrational distortions created by the homing head antenna radome during significant angular deflections in its polar diagram. American experts believe such compensation is necessary to preclude large guidance errors arising, for example, when the target is significantly higher in altitude than the missile-carrying aircraft. This also increases the missile's effectiveness in destroying high-altitude targets. Use of the semi-conductor base has also increased the functional reliability of the AIM-54C transceiver.

Today the Hughes Aircraft corporation continues its modernization of the Phoenix missile, striving to increase its resistance to deliberate interference, further enhance its combat effectiveness, and improve its operational characteristics. Corporation experts believe the use of a new radar antenna with decreased side-lobe levels will facilitate increased resistance to interference, as will an increase in emitting power of the homing head transmitter. Lowering the noise coefficient of the homing head receiver will increase the ranges at which targets can be detected and tracked, especially with a low

effective zone of dispersion. It is also planned to achieve improved missile capabilities and operational characteristics by changing the steering program in the guidance system so as to take into account the specific tactical and technical characteristics of potential targets or the employment of new electronic warfare measures by the probable enemy. Foreign press reports emphasize that such systems reprogramming could be accomplished from on board the F-14 fighter by means of cable connecting the aircraft to the missile equipment. A promising frequency synthesizer is being developed for the integral micro-circuits of the homing head transceiver which should simplify the selection and change of letter frequencies. In addition, a new, closed-cycle, automated system is under development for maintaining the proper working-temperature range of the missile as a whole. This should significantly improve the service conditions of the Phoenix missile on the aircraft.

**Intermediate-range missile guidance systems.** Intermediate-range missiles found in the air force inventories of the NATO countries include the AIM-7 Sparrow (U.S.), Skyflash (Great Britain), and R.530 Super Matra (France). These missiles employ navigational systems with semi-active radar guidance in which target illumination is accomplished using radar tracking, and the reflected energy received by the seeker head is used for homing. Radar tracking may take place in a continuous radiation mode or one that employs emission impulses with a continuous target illumination channel.

The American AIM-7 Sparrow has a guidance system consisting of semi-active homing (tracking) head and automatic pilot, which work as follows. The missile receives the signal from the target in a background of clutter and guidance signals from its own transmitter; in this regard, signal strength from the target can be several orders of magnitude less than that of the clutter. The missile receiver is designed to create a coherent reference signal providing for operation of the approach velocity target selection circuit. After being transformed to an intermediate frequency, the signal received by the tail antenna closes the circuit of the automatic frequency control system of the high-frequency heterodyne, and is used as a standard signal in the balanced mixer.

Arriving at the forward antenna, the target signal is transformed to an intermediate frequency and amplified by a wide-band amplifier. The Doppler frequency then stands out and is amplified in the amplifier, whose band width is equal to the entire range of probable Doppler frequencies. This signal is then transformed by the velocity-tracking heterodyne, which tracks the signal using a narrow-band filter. Frequency search is accomplished by a signal spectrum shift relative to the velocity strobe. When the signal exceeds detection threshold, search ceases and the signal is checked to determine whether it is a coherent target signal or a false alarm caused by noise. The signal passes from the narrow-band filter first to the unit where the control signal is formed, then to the automatic pilot, the antenna control unit and hydraulic servo link.

It has become necessary to seek new methods and technical solutions in connection with developing a new generation of semi-active homing heads for hard-body circuits and increasing the demands placed on them. One such solution is considered the use of an inverse receiver enabling the features of mono-impulse systems to be combined with those of systems developed earlier. The inverse receiver is a narrow-band system with two frequency transforms, in which the velocity tracking system controls a high-frequency heterodyne, and the input signal of the narrow-band filter is the high-frequency signal of the homing head antenna. The target signal received by the forward antenna goes to a preliminary amplifier, narrow-band filter and to the first intermediate-frequency amplifier. The second intermediate-frequency signal is formed using a transforming heterodyne and is fed into a hydro-stabilizer, the unit where the guidance signals are formed, and to the local oscillator with velocity tracking, which also controls the reference channel.

The British Skyflash missile, with semi-active radar guidance system, was developed based on the AIM-7E Sparrow. Nonetheless, it is not considered abroad to be a modification of it, but rather a new missile system which meets modern requirements. The Skyflash employs a semi-active radar mono-impulse inversion homing head built by the Marconi firm, consisting of three main easily replaceable units: antenna with rotating mechanism, signal receiver, and signal processing unit. The antenna is hydro-stabilized and mounted on a gimbal joint. The system operates on the Descartes system of coordinates and has a maximum bearing angle of over 40 degrees. Light, direct-current electrical motors provide azimuth and angle of sight control in the antenna drive. The homing head receiver has four receiving antennas, which form three signal processing channels. Printed circuits are used in the design of the receiver and signal processing unit. Each subsystem of these units functions independently, facilitating servicing and repair. It is believed that features such as small signal-to-noise ratio and narrow velocity selection strobe in the mono-impulse receiver provide the homing head with good characteristics in the face of interference and enable differentiation of individual targets for aircraft flying in mass formation.

It has also been noted that the logic circuits of the signal processing unit provide protection from most types of interference. The high assembly density of homing head components is made possible thanks to hard-body circuits and other uses of the most sophisticated technology, and allows extremely compact construction within a cylindrical volume 0.47 meters long, 0.18 meters in diameter. The homing head is a functionally independent unit and can be easily removed, which simplifies its operation. It is connected to the automatic pilot and electrical supply in addition to the tail antenna of the reference channel.

The automatic pilot and electrical supply unit are modernized variations of the AIM-7E missile. The automatic

pilot functions on the same proportional guidance principle and maintains Skyflash flight on intercept trajectory by transforming homing head signals into lateral acceleration commands. The automatic pilot also receives information from the roll rate gyroscope for missile roll stabilization. Thermal batteries provide the electrical power supply for the Skyflash. They will operate for 10 years without checking or servicing (it is expected this will increase to 18). A hydro-accumulator powers the control actuators. This consists of a cylindrical, gas-loaded chamber placed in an elastic, rubberized container which itself is contained inside a reservoir with hydraulic mixture. The gas chamber is pierced during missile launch, expanding the elastic container which, in turn, compresses the hydraulic mixture and expels it into the hydraulic system.

The French R.530 Super Matra is designed chiefly for intercepting high-speed targets flying at high altitudes. Its semi-active radar homing head functions in the impulse mode and provides a high degree of guidance accuracy thanks to complex selection circuits and optimal control signals processing.

Western military experts believe that the weight and dimensions of existing medium-range missiles limit the operational radius of the carrier aircraft and degrade its maneuverability. In addition, the missile operational sequence (including target search and identification, missile preparation and launch) significantly complicates their employment when many targets are present. The United States is presently developing the medium-range AIM-120, part of the AMRAAM program, to deal with this. Guidance for the initial and subsequent flight trajectory segments is effected using an inertial system and special unit which receives corrective commands from the aircraft's radar system. An active radar impulse homing head comes into operation for the final flight trajectory segment. This head provides better interference protection than currently existing varieties, especially when the enemy conducts radio-electronic jamming. It is believed this homing head is capable of reliably distinguishing signals from targets flying at extremely low altitudes against ground or water background; it can engage targets flying low in a background of terrain and clutter as well as those effecting maneuver with a G-force of 6. It is reported in particular that the AIM-120 homing head can lock on a target 3-5 square meters in reflective surface area at ranges of 3-8 km. Increased guidance accuracy is achieved in the final segment of flight trajectory through the use of digital signal processing in the homing head.

Efforts are underway in other countries as well to develop new intermediate-range guided missiles. The firm British Aerospace and Sweden's SAAB have begun joint development of the Skyflash-90 with active radar homing head. At the beginning of the 1990's, the missile is expected to enter the inventories of those countries where high cost prevents employment of the AIM-120.

Development of the highly maneuverable, multiple-target MICA missile is underway in France. This missile will be outfitted according to a composite guidance scheme: a small-scale inertial system and active radar homing head which can be replaced by a passive infrared system.

**Short-range missile guidance systems.** Short-range missile systems (for close air combat) most commonly employed include the AIM-9L Sidewinder (U.S.), R.550 Magic (France), Shafir-3 (Israel), and Kukri (South Africa). These are equipped chiefly with infrared homing heads.

The AIM-9L missile has a passive infrared homing head with the following main elements: magnesium fluoride radome; rotating optical system mounted on a gyroscope rotor; modulating disk in the focal plane of a linear system used to project target image onto a radiant-energy receiver; an antimony-indium detector; cryogenic container containing lens filter; receiver and cryostat. Maximum angular tracking speed of the homing head is 20 degrees/second, maximum bearing angle—plus or minus 40 degrees, dead zone with respect to the sun—plus or minus 5 degrees. Homing head target lock is indicated by an audio signal.

The R.550 Magic is designed to achieve destruction of highly maneuverable air targets from the rear hemisphere. It is equipped with infrared homing head with frequency modulation and operates in the spectrum of infrared energy emitted from the target's heated engine parts and carbon dioxide from gaseous target exhaust. For enhanced sensitivity, the radiant-energy receiver is cooled with liquid nitrogen (there is a nitrogen cylinder in the launch mechanism).

France has developed Magic-2, a new modification of the missile, to provide enhanced resistance to interference. The missile employs a heat-sensitive homing head with mono-impulse, radiant-energy receiver. Its guidance system has a digital autopilot and integral-circuit microprocessor.

The Israeli Shafir-3 missile is based on the American Sidewinder but has a more effective radar proximity fuse and more powerful warhead.

The South African Kukri missile is based on the Magic. Foreign press reports state that it uses a helmeted sighting device for target designation which functions in the following manner. Each side of the pilot's helmet contains two photo-diodes coupled to the spatial orientation system which is affixed to the sides of the cockpit. At any time during flight the pilot can check the alignment of the reticle in his pressurized helmet relative to the aircraft axis. As he turns his head, the signal generated by the photo-diodes is proportional to such movement in two planes. An aiming marker is projected onto the helmet's viewing screen in front of the pilot's right eye.

When electric current is fed to the missile for engagement, the infrared homing head is linked to the position of the sighting device in the helmet and follows the sighting as viewed by the pilot. When the target goes outside engagement zone boundaries, the aiming marker disappears from the field of view. When the homing head detects a target, an audio signal is heard in the pilot's headset and the pilot uncages the homing head. He can launch the missile or continue tracking the target using the homing head and evaluate the tactical situation.

Western military experts believe that the following overall requirements will have to be taken into account in the development of new short-range missiles for use in close air combat: maximum possible launch range; independent post-launch missile guidance to target (enabling the carrier aircraft to effect any maneuver); missile independence from carrier aircraft radar systems; expansion of possible launch configurations, enabling (in the best case) launch from any approach aspect or angle; elimination of any limitation in overload or acceleration of the aircraft at the moment of launch; the ability to destroy highly maneuverable air targets; the ability to keep the missile in a high state of combat readiness over a long period of time; simplicity and low cost with respect to technical servicing.

Leading military industrial firms of the NATO countries—Hughes Aircraft (U.S.), British Aerospace (Great Britain), BGT (West Germany) and the Norwegian state military plant Raufoss Ammunitionsfabrikk—are presently participating in the development of a promising short-range missile, the AIM-132, as part of the ASRAAM program. In particular, the West German firm is working on a passive infrared homing head and special guidance system (target designation). The British corporation is responsible for guidance unit electronics. Norwegian specialists are developing the solid-fuel missile engine. In addition, several types of guidance systems are being considered for the missile. SAT, a French firm, has proposed an infrared imagery homing head with multiple-unit (mosaic) radiant energy receiver and digital signal processing. The latter is based on an onboard microprocessor and digital autopilot with its own integral-circuit microprocessor. French experts believe such a guidance system will provide for better target identification, enhance resistance to jamming and increase missile guidance accuracy. A variant of the inertial guidance is being considered at the same time, as is its use in combination with other systems using a ring-shaped laser gyroscope.

The American corporation Hughes Aircraft is developing an advanced-technology infrared homing head for short-range missiles. Its focal plane will contain a miniature (not more than 1 cm) matrix. Hughes Aircraft representatives state that the matrix has three important advantages over existing-generation transducers: significantly enhanced homing head sensitivity enabling detection and lock-on of low-contrast targets; reduced interference level from clutter and local objects thanks to

improved information provided by a large number of photodetection components; improved guidance in the final segment of flight trajectory thanks to full-target imagery, not just homing guidance to its "hottest" section. Matrices to be placed in the homing head focal plane will be a hybrid-lattice array based on a compound of mercury telluride and cadmium with 4096 (64 x 64) elements. The lattice will comprise one quadrant of a larger hybrid-lattice array consisting of 16,384 (128 x 128) elements.

It is supposed that, in addition to active homing heads being able to operate successfully in the millimeter frequency range, passive systems can do so as well, in spite of the fact that radiation from the earth's surface is very much lower ( $10^6/10^7$  times less than for a wavelength of 10 micrometers). This radiation and the contrasts can be detected, however, based on superheterodyning and optimal filtration. In this range it is also proposed to significantly improve homing heads operating at frequencies greater than 100 giga-Hertz. Assimilating this range will enable the use of high-directional, small-diameter antennas (an antenna 150 mm in diameter, for example, will have a beam width of 11 milli-radians). With regard to digital data processing equipment, it is planned to use electronic scanning antennas, synthesized aperture antennas, and systems for object imagery identification.

Automated or composite guidance systems are planned for air-to-air missiles in the future. Based on inertial systems, these will be able to insure practically ideal protection from interference and jamming when engaging low-maneuver targets, and will provide for missile autonomy in flight, albeit with some degradation in guidance accuracy depending on the range to target. Inertial systems today are still not used for short-range missiles in spite of the trend towards decreasing their dimensions and cost. One inertial system considered possible is a variant which uses two types of non-gimballed components: a gyroscope with elastically compensated suspension, and ring-shaped laser gyroscope. It is felt that, in addition to lowering the cost, non-gimballed devices will be developed and improved with an aim towards increasing accuracy and decreasing size for operation in the drift range from 0.1 to 100 degrees/hr. As far as the 20-100 degree/hr range is concerned (the most common for missiles approximately 150 mm in diameter), a device 1.5-2.0 cubic decimeters in volume is envisaged.

It is planned to couple the missile guidance system with the carrier aircraft using a digital drive linkage or fiber optics. In the future, air-to-air missiles will be outfitted with onboard digital computers with built-in test system, Identification Friend or Foe (IFF) systems, optimal guidance-signal processing, etc. In other words, efforts are underway to develop guidance systems which will insure a high kill probability for present and future air targets.

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9768

### Operational Use of Optical Electronics in Air Platforms

*18010041i Moscow ZARUBEZHNOYE VOYENNOYE OBOZRENIYE in Russian No 10, Oct 87 (signed to press 5 Oct 87) pp 45-46*

[Article by Lieutenant Colonel V. Sofronov, candidate of military sciences: "Operational Use of Optical Electronics in Air Platforms"]

[Text] In their plans for improving the information flow so as to provide more effective command and control in combat operations under a variety of conditions, American military strategists assign a special role to the use of infrared optical electronics aboard aircraft. It has been gathered from foreign press reports that the concept of using such air-based facilities first appeared in the leading capitalist countries at the beginning of the 1950's. Later on, with the rapid development of space technology, this seemed to withdraw into the background somewhat; nonetheless, its development has proceeded rather intensely and continuously.

According to the opinion of foreign military experts, the expediency of using aircraft or aerostats as carriers of information systems is based on increased requirements for operational reliability in command and control systems, and for their ability to fulfill assigned missions, being situated outside areas of susceptibility to destruction or opposition. It is believed also that air-based optical electronics has the advantage of relatively high maneuverability, flexibility, and the capacity of being operationally removed into one area or another of combat employment. It is believed that optical electronics can help detect warheads on ballistic missiles and other objects in near-Earth space in various segments of flight trajectory against the background of both open space and the Earth's surface. In order to identify targets in this regard against a background of decoys, especially upon entry into the dense layers of atmosphere, the effect of natural atmospheric selection may be used.

In the development of such optical electronic systems, American experts are making special demands of the air-based carriers. Mainly they are requiring a capacity for prolonged flight at speeds and altitudes which insure favorable operating conditions for the optical electronics, as well as sufficient load-carrying capability so as to be able to accommodate the necessary equipment: sensors with data processing and transmission apparatus. A great deal of interest is being expressed in high-altitude manned aircraft and remote-controlled unmanned aircraft. Thus, American experts consider that aircraft such as the U-2, TR-1, Boeing 767, DC-8 and L-1011 may be used in this regard.

One proposal in particular has been the development of a system based on a U-2 (TR-1) carrier comparable in its effectiveness to the IMEWS satellite system for detecting ballistic missile launches. The sensory apparatus planned for use on board the aircraft consists of infrared

(operating in the 8-12 micrometer range) detectors set in the focal plane of a telescope with focal length 91.5 cm and aperture diameter 45.7 cm. With linear dimensions of the detectors being about 0.1 mm, angular coordinate resolution will be 0.11 milli-radians. A two-row array of detectors will entail a total number of 1310 - 83,710 elements; a three-row array, 1995 - 125,000. Spatial scanning in azimuth will be accomplished through telescope rotation at the rate of 24 degrees/sec; angle of elevation scanning will be effected from -2 to +20 degrees. With target radiation intensity of about 10 W/sr, detection can be effected at approximately 3000 km.

The Boeing Corporation is presently working on an "Airborne Optical Adjunct (AOA)" project within the framework of the militaristic "Star Wars" program, designed to develop air-based optical electronic facilities. It is reported that the project entails mounting a telescope and mosaic infrared sensor (operating in the long-wave range) on board a modernized Boeing 767 aircraft along with signal processing and communications equipment. Corporation representatives believe flight testing planned for 1988 should show that the developed components can be integrated into system capable, under actual conditions, of detecting, tracking and identifying ICBM warheads in their exo-atmospheric segment of flight trajectory and of transmitting this information to ground-based anti-missile defense complexes. Additionally, it is believed these experiments will determine and define a technological basis for subsequent efforts and will reduce technological risk to a minimum in the development of a series prototype.

It has been noted in the foreign press that the Pentagon intends to acquire 40 of these aircraft in organizing their alert forces, 14 of which will be on a continuous state of alert in the air.

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#### Naval Forces of the Netherlands

18010041j Moscow ZARUBEZHNOYE VOYENNOYE  
OBOZRENIYE in Russian No 10, Oct 87 (signed to  
press 5 Oct 87) pp 47-52

[Article by Captain 2d Rank Yu. Kravchenko: "Naval Forces of the Netherlands"]

[Text] The military-political leadership of the Netherlands, an active member of NATO, is pursuing a policy in support of the bloc's aggressive aspirations and advocates close cooperation within the NATO framework. Thus, it declared its intention to increase annual military expenditures by two percent, and earlier agreed to the deployment on its territory of 48 American cruise missiles, beginning in 1988. It devotes a great deal of attention to the development of its armed forces, including its naval forces.

The Netherlands occupies a very advantageous position at the juncture of the sea lanes leading to Western Europe. NATO experts believe its naval forces are capable, along with those of its allies, of successfully accomplishing missions designed to maintain favorable conditions in the open regions of the Eastern Atlantic, North Sea and English Channel, and protect convoys with reinforcements, armament and items of logistics and technical supply arriving from across the ocean.

The Netherlands' naval forces fall under national control in peacetime, but during periods of sharply increased international tension or at the outbreak of war are transferred to control of the NATO combined fleet commanders in the Eastern Atlantic and English Channel Zone. Composition of forces transferred is determined based on the specific situation which has developed and on the necessity of protecting national interests.

Organization and combat composition. The naval forces of the Netherlands consist of a fleet, naval aviation and marines. They are headed by a commander who is simultaneously chief of the naval staff. Organizationally, the naval forces consist of four commands: Naval Forces Netherlands, Naval Forces Antilles, Naval Forces Aviation Command and Marines (fig 1).

According to foreign press accounts, the naval forces currently have 48 combat vessels and cutters (5 submarines, 16 guided missile frigates, 24 minesweepers and 3 escort patrol boats), 15 land-based patrol aircraft, 22 anti-submarine helicopters, and over 20 auxiliary vessels, including 2 all-purpose supply/support ships. The tactical and technical features of the warships and cutters are as shown in Table 1. Total personnel strength is 17,000 men, of which 12,500 serve in the navy, 1700 in naval aviation, and 2800 in the marines.

The Naval Forces Netherlands Command includes a flotilla of anti-submarine ships, a submarine squadron, two brigades of minesweepers, a division of escort cutters, and individual ships which do not fall under the naval units.

The guided missile frigates are intended to be employed along with the all-purpose supply/support ships in three operational naval groups approximately equal in composition. Two of these will operate in the Eastern Atlantic; the third, at the approaches to the English Channel. The all-purpose supply/support ships will provide mobile logistics support to the operational groups in the Atlantic. Supply and logistics support in the English Channel Zone is planned to be organized directly out of naval bases, stations and seaports, as well as from specially designated merchant ships.

Minesweeper vessels are to be placed in three groups for combat missions, two of which will be deployed in the Netherlands coastal waters to maintain shipping and

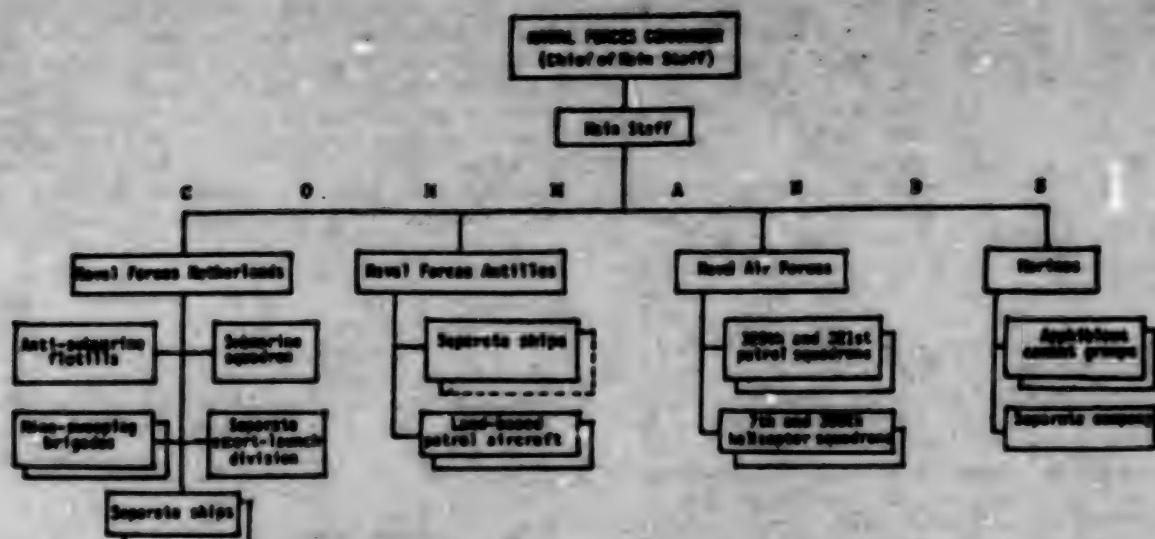


FIGURE 1 Organizational Structure of Netherlands Naval Forces

destroy enemy-laid mines at approaches to ports and naval bases. The third group is intended for employment in the English Channel Zone.

The Naval Forces Antilles Command has no permanent composition. It may contain individual ships and land-based patrol aircraft, as well as one amphibious combat group from the Marine Forces Command. These forces are detached for a certain period of time with the mission of safeguarding overseas territories of the Netherlands.

The Naval Forces Aviation Command includes the 320th and 321st squadrons of land-based patrol aircraft (13 P-3C Orion, 2 F.27 Maritime aircraft) and two squadrons—the 7th and 860th—of anti-submarine helicopters (22 SH-14B, -C and UH-14A Lynx helicopters). The patrol aircraft are based at Falkenburg Air Force Base and the helicopters at De Koy. Two F.27 Maritime aircraft are permanently stationed in the Antilles. Naval forces aviation is headed by a commander whose headquarters is located at the main naval base of Den-Helder.

The Netherlands' naval forces relatively recently restored their air fleet. Land-based patrol aviation was re-outfitted with P-3C Orion and F.27 Maritime aircraft at the beginning of the 1980's, replacing the Neptune and Atlantic aircraft. The new Lynx helicopters appeared at this time (24 were produced, 2 of which were subsequently lost in air accidents).

The SH-14B and -C Lynx helicopters belonging to the 860th Squadron are assigned to carriers and accomplish mainly anti-submarine missions. They are equipped with submersible hydro-acoustic station and magnetic detector, and can be outfitted with two torpedoes of the Mk. 44, 46 or Stingray variety. Maximum allowable weight for take-off of the SH-14B and -C is about 4750

kg, cruising speed is 232 km/hr, and service ceiling is 2375 m. The helicopter can conduct a one-hour search for a submarine in an area 50 miles from the carrier. The 7th Squadron (5 UH-14A) is also prepared for the conduct of search and rescue missions.

The Marine Forces Command is headed by a commander (commandant). As noted in the foreign press, the marines are designated for reinforcement of NATO ground force units in Norway and the English Channel Zone at the outset of combat operations, and also for the defense of overseas territories and the most important naval facilities.

The marine forces consist of two amphibious combat groups (1000 men each), a separate company specially designated to conduct combat operations in Arctic and mountainous regions, separate reconnaissance-commando and special purpose units. An additional amphibious combat group consisting of trained reservists is planned to be formed in wartime. Each amphibious combat group is composed of four companies: two infantry, one fire support, one headquarters. The infantry company consists of a headquarters and four platoons (three infantry and one fire support). The fire support company has five platoons (mortar, machine gun, anti-tank, reconnaissance and engineer). The basic weapons of the fire support company are the Dragon ATGM, 106-mm recoilless gun, and 81-mm mortars. The headquarters company has five platoons: communications, supply/logistics, maintenance/repair, transportation and medical. It is reported in the foreign press that the number of infantry companies in the amphibious combat group in wartime can be expanded to four.

One marine amphibious combat group and separate company is stationed on Netherlands territory. The second is in the Antilles (Willemstad). The naval forces

9 May 1988

Ship class, no. operating; date number; year open <sup>1</sup>	Displacement (tons) standard/total	Magnifications (x)	Power capacity (hp)/ Max speed (knots)	Cruising range (miles) at a speed of (knots)	Crew	Armament <sup>2</sup>
S U B M A R I N E S						
Surveiller (5000, 6000) 1972	2310/2540 <sup>3</sup>	7.1	(10000) 14.5	1000/14	67	533-mm torpedo launcher (8)
Solynter (5000, 6000, 6001) 1981 - 1985	2320/2630	7.3	(10000/17)	1000/14	67	533-mm torpedo launcher (8)
GUIDED MISSILE FRIGATES						
Tromp (5000, 6001)	3040/3200	12.4 14.0 4.6	50,000/30	1000/18	206	Rapido missile system--2 x 4 (16 mm), Tactor air defense missile system--1 x 1 (8000), Sea Sparrow MM system (16 mm), 100-mm gun--1 x 1, 210-mm torpedo tube--2 x 2, AH helicopter
Jacob van Werkendam (7000, 8000) 1986	- /3750	12.5 14.0 6.2	50,000/30	1000/14	206	Rapido missile system--2 x 4, Tactor MM system--1 x 1 (16 mm), Sea Sparrow MM system--1 x 1 (8000), 210-mm torpedo tube--2 x 2, AH helicopter
Corteweger (7000 - 8000, 8001 - 1986 - 1988 - 1990)	3050/3450	12.5 14.0 6.2	50,000/30	1000/18	176	Rapido MM system--2 x 4, Sea Sparrow MM system-- 1 x 1, 210-mm torpedo tube-- 2 x 2 (8000-8100), 100-mm gun--1 x 1, 210-mm torpedo tube--2 x 2, AH helicopter
De Zeven (7000 - 8000) 1987 - 1990	3210/3830	112.4 112.5 5.0	30,000/30	6000/12	180	Rapido MM system--2 x 4, Sea Cat MM system--2 x 4, 100-mm gun--1 x 1, 210-mm torpedo tube--2 x 2, AH helicopter
H I G H D E T E C T O R S						
Allseer <sup>4</sup> (8000 - 8001) 1983 - 1987	810/980	61.1 62.1	2100/18	3000/12	up to 40	20-mm gun--1 x 1, echo- detecting equipment, various types of sensors
C O A S T A L H I G H - S V E E P E R S						
Bontekoe <sup>5</sup> (8000, 8001, 8002, 8003, 8004, 8005, 8006 - 1990)	275/452	46.1 47.1	2100/18	2100/18	up to 26	20-mm gun--1 x 1 or 2 x 1, various types of sensors
E S C O R T L A U N C H E R S						
Soldier (2000 - 6000) 1984 - 1990	180/225	26.2 27.0	1100/18	1000/12	20	20-mm gun--2 x 1, bomb release (2), depth charge throwers (2)

<sup>1</sup>The quantity of rocket launchers and artillery pieces, and the number of launcher rails (containers) and barrels they contain are indicated by the figures used with multiplication signs. This sign applies to quantity of torpedo launchers and number of tubes.

<sup>2</sup>For submarines, the first figure indicates surface displacement; the second--submerged displacement.

<sup>3</sup>Numbers outside parentheses indicate power and speed in the surfaced mode; within parentheses--in the submerged mode.

<sup>4</sup>SeaMaster air defense system will be mounted on all ships of this design.

<sup>5</sup>Three ship detectors of the Allseer class (ship numbers 800-804) are presently under construction.

<sup>6</sup>The coastal mine-sweepers (8000 and 8001) have been re-equipped for supporting underwater work.

TABLE I Tactical-Technical Characteristics of Naval Vessels of the Netherlands

Ship class	1987 status	To be inactivated	To be constructed	1993 status
<b>Submarines</b>				
Walrus	-	-	4	4
Swordfish	2	-	-	2
Dolphin	3	3	-	-
<b>Guided missile frigates</b>				
Tromp	2	-	-	2
Jacob van Heemskerk	2	-	-	2
Corteweg	16	-	-	16
Van Speijk	2	2	-	-
M-design	-	-	8	8
<b>Mine detectors</b>				
Alkmaar	12	-	3	15
<b>Coastal mine-sweepers</b>				
Bokum	12	12	-	-

TABLE 2 Status of Netherlands Naval Forces

command believes that the fighting strength and composition of their marine forces will not undergo significant changes in the near future. Serious attention is being given the development of a plan for wartime interaction and cooperation with units of Great Britain's 3d Marine Brigade.

Provisions for reaching required troop strength and personnel training. The naval forces are brought up to combat strength in accordance with the law on general military service and through the enlistment of volunteers. The active-duty term of service prescribed by law is 14-17 months. Volunteers sign a contract for six years after which they have the option of continuing regular military service until they reach the age of 55 or 30 years of service. The preponderance of navy personnel on the whole (about 85 percent) are servicemen who have signed a contract for a certain period of time; the remainder are conscripts.

Officers obtain their education at a naval institute in the city of Den-Helder. They undergo a five-year program which graduates up to 50 individuals each year. Officer students pursue a common course curriculum during the first three years which provides the basis for their further specialization. After successful completion of this course work, the students are awarded primary officer rank. Navy students are sent to ships of the fleet for a year of practical training and the future marine officers are assigned to marine units. The fifth year is spent at the naval institute and certain civilian institutions of higher learning, depending on student specialty. After completion of the full five-year training program, graduates are awarded the next officer rank.

Navy enlisted and noncommissioned officers are trained at training centers (basic training) and schools: ordnance, anti-submarine warfare, navigation and communications, engineering and logistics. Personnel selected

for service in naval aviation are assigned to the naval aviation school upon completion of the required specialization training as outlined above. Marines undergo school training in Rotterdam and at a training center for amphibious training. The duration of training depends on the specialty being acquired and the category of military service; it can be from several months to one year.

**Prospective developments.** Development of naval forces is taking place in accordance with a 10-year shipbuilding program (1979-1988). By 1993 the navy is expected to receive 4 Walrus-type submarines and 8 M-design guided missile frigates. By the end of the 1980's construction of a series of minesweepers (15 ships of the Alkmaar type) should be completed. As the new vessels enter the naval inventory, obsolete ones are allocated to the reserves, sold or demolished (see Table 2).

As reported in the foreign press, Walrus-type submarines are scheduled to replace the Dolphin variety. Two submarines, the S802 Walrus and S803 Zeev, are being outfitted afloat at the naval shipyard in Rotterdam, and two are on order. In developing the design, attention was focused mainly on building an improved version of the Swordfish-type submarine, having a more sophisticated weapon guidance system and making less noise. The high level of automation with respect to handling and operation of the ship and its weapon systems will, in the opinion of foreign experts, result in a crew strength reduction from 67 to 50. The submarine's chief tactical and technical features are as follows: length—67.7 m, width—8.4 m, draft—6.6 m; submerged displacement—2800 tons (surface displacement—2450 tons); maximum underwater speed—20 knots (surface speed—13 knots); operating depth—300 m; armament—4 533-mm torpedo launchers capable of firing Mk48 torpedoes or Harpoon missiles (combat load is 20 torpedoes or missiles).

The Naval Forces Netherlands Command believes that the submarine force of the next decade will be based on a level of six multi-purpose diesel submarines.

Serious attention is being given to development of the navy's escort forces. Construction of a series of multi-purpose M-design guided missile frigates is continuing. The type vessel was launched in July 1987. Two are in shipbuilding berths and a fourth is being prepared for lay-down. The construction order for a second group of four M-design ships was submitted to industry in 1986. Foreign military experts believe that M-design guided missile frigates will accomplish a wide variety of missions: submarine search and destroy, engagement of missile-carrying cutters and defense from air attack. Tactical and technical features of the ship are as follows: full-load displacement—3320 tons (standard displacement—2800 tons); length—122.3 m, width—14.4 m, draft—4.3m; twin-shaft, composite, CODOG-type, diesel-gas turbine engine (two gas turbines of 18,000 hp each, two diesel engines of 4000 hp each) enable development of a maximum speed of 30 knots; cruising range—5000 miles at an economizing speed of 18 knots; ordnance—two 4-container Harpoon missile launchers, an 8-container Sea Sparrow missile launcher, single-cannon 76-mm OTO Melara artillery piece, 30-mm 7-barrel Goalkeeper anti-aircraft system, two 20-mm single-barrel artillery pieces, two double-tubed 324-mm torpedo launchers, helicopter. The crew consists of 141 men, including 16 officers.

Up until October 1986 the naval forces of the Netherlands had six guided missile frigates of the Van Speke variety. Four of the ships were sold to Indonesia, and foreign press reports state that country has expressed an interest in acquiring the remaining two. The naval forces command believes two Van Speke-type frigates should remain in the inventory until the first M-design ships are delivered to the fleet.

Taking into consideration ships under construction and those which will come out of the fleet inventory, the strength of the Netherlands' naval escort forces will increase, according to Western experts, by about 30-35 percent (the number of guided missile frigates will reach 22).

Mine-sweeping forces will undergo development through the construction of modern Alkmaar-type mine sweepers [Editor's note: These are being built as part of the "Tripartite Program," a joint development effort on the part of France, Belgium and the Netherlands], as the aging Dokkum-type ships are gradually removed from the fleet. Twelve mine sweepers have now been delivered to the naval forces and three remain in various stages of construction. Foreign press reports state that all ships of the series will be operational in 1988. The question of building a 10-16 ship series of a new design of mine sweepers beginning in 1989 is being considered. It is expected that the first seven ships would be operational by 1997. Thus, by 1993 the Netherlands' mine-sweeping

forces will consist of 15 modern ships. It is possible that the number will exceed this figure (if a positive decision is made with respect to building the new series).

Significant changes are not expected to come about in the near future with regard to the combat composition of naval forces aviation. The first modernization of Orion P-3C land-based patrol aircraft might begin in 1988-1989. It is planned to improve the onboard armament and outfit the aircraft with anti-ship Harpoon missiles. Funds will probably be allocated for the acquisition of two more aircraft of this type from the United States. Foreign press reports state that the Lynx helicopters will remain in the armament, apparently, until 2000, after which time they will be replaced by new models whose type has not yet been determined. Possible acquisition of a few more Lynx helicopters is being discussed. On the whole, the naval forces command believes that in order to successfully accomplish the missions entrusted to naval aviation, the air inventory must include 21 land-based patrol aircraft and about 40 helicopters.

Judging from foreign press reports, combat and operational training in the Netherlands naval forces is oriented towards enabling its personnel to assimilate new technology and the tactical means of using it, enhancing the combat readiness of ships and units of the fleet, and developing joint operations with the naval forces of other member nations of the aggressive North Atlantic alliance as part of the NATO combined naval forces in the Eastern Atlantic and English Channel Zone.

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9768

#### Diesel Submarines

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[Article by Captain 1st Rank V. Kipov: "Diesel Submarines"]

[Text] Just over 10 years remains until the beginning of the next century but shipbuilding programs and ship construction designs are already being developed which will determine the combat composition and capabilities of fleets in the opening decades of the 21st century.

According to foreign press reports, diesel submarines (or non-nuclear submarines, as they are still referred to) continue to occupy an important position in these programs. The total number of submarines in the capitalist countries over the past 30 years has quadrupled, now reaching approximately 200 (of which more than 120 are in the NATO countries alone), while the number of countries having them in their fleets has doubled. The submarines and the ordnance systems they carry have undergone constant development and improvement over

this period. Submergence depths have doubled or tripled, speeds have increased one-and-a-half times, and cruising ranges have doubled. In addition, operational secrecy has been enhanced, noise levels lowered. Modern means of detection have entered the inventory; guidance and homing guidance have been introduced into the armament.

It is the opinion of Western experts that qualitative and quantitative improvements in submarines will continue into the future. The basic trends in their development are determined, on the one hand, by specific national programs for production or acquisition of military hardware and, on the other, by scientific and technological progress in those countries occupying a leading position with respect to submarine construction and development of submarine armament (ordnance, hydro-acoustics, radio electronics, power systems). Such countries include first and foremost the United States, Great Britain, West Germany, France, the Netherlands, Italy and Sweden. The state of the submarine fleet in the various capitalist countries is examined below.

**The United States** does not actively construct diesel submarines (there are only four in the entire fleet, built at the end of the 1950's). Instead it focuses its main attention on the production of nuclear submarines. At the same time, the United States encourages diesel submarine development in other countries, renders technological assistance, and supplies them with anti-ship missiles, torpedoes, radio electronic and other equipment.

Great Britain has 15 diesel submarines in its regular fleet (13 Oberon and 2 Porpoise-type), built at the end of the 1960's. While modernizing 9 Oberon-type submarines, it is also pursuing a program for construction of 10 Upholder-type boats for its own navy as well as for export (main tactical and technical features of the new-design diesel submarines are as shown in the table). The export version is being offered to the navies of Canada and Saudi Arabia. The lead submarine of this series has been launched and is expected to be supplied to the fleet in March 1988. A construction order for an additional three was submitted in 1986. Design requirements for the submarine prescribe the service life between periods of major overhaul as seven years or 15,000 cruising hours. Diesel submarine construction has been renewed after a lapse of 20 years.

West Germany's naval forces include 24 submarines: 6 "205"- and 18 "206"- design boats built from the end of the 1960's through the middle of the 1970's. A program for submarine development has been adopted which provides for the modernization of 12 "206"-design boats, construction of 6 submarines of the new "211" variety (having a displacement of 1400 tons), and a subsequent transition to the "212" design, development of which has just begun. West Germany is a major

supplier of submarines for export—more than 30 boats of West German manufacture are found in the naval force inventories of a number of capitalist countries.

The naval forces of France contain 14 submarines: 9 of the Daphne variety built in the second half of the 1960's, 4 Agosta-type (released to the navy at the end of the 1970's), and 1 of the experimental Narval type submarine, built in 1955.

France's naval headquarters and industrial enterprises actively collaborate in the development of diesel submarines for export. Foreign observers believe that in the future France, like England, may return to submarine construction using conventional power engineering for its naval forces.

**Italy.** In addition to two Tango-type submarines (obtained from the United States in 1973-1974) and four Toti-type boats, built at the end of the 1960's, Italy's naval forces recently acquired four Sauro-type submarines. Another four are under construction or on order. The S90-design submarine is under development (displacement—2400 tons). Construction should begin the end of the 1980's, beginning of the 1990's.

**Canada.** Modernization of the three Oberon-type submarines in the Canadian naval forces inventory has been completed. Mounted on it are the Mk 1 fire control system, AN/BQG-501 hydro-acoustic station (which passively determines range to target), and new storage batteries. The periscopes are outfitted with infrared cameras capable of operating at low illumination intensities. Mk37C torpedoes have been replaced by the modern U.S. Mk48 mod 4. Experts believe the Oberon submarines will begin being removed from the fleet inventory in 1992-1993, and the boats which replace them will have to be capable of operating in Arctic regions. In this regard, the possibility of building nuclear submarines or boats with a composite power system is being investigated. It is planned to increase the number of submarines to 12. According to the most recent foreign press reports, the Canadian Defense Ministry is studying the possibility of purchasing an additional 4-12 nuclear submarines at a cost of 400-500 million dollars each. If the decision is made to do this, the first submarine should become operational in 1996 or 1997.

**The Netherlands.** Construction of a series of Walrus-type submarines has begun to replace five now in the inventory. In the spring of 1987 a major fire broke out on board the lead submarine just prior to the start of sea trials, resulting in the destruction of a significant portion of the equipment and, experts fear, changes in properties of the steel due to the tremendous overheating. It is possible that upon completion of construction the submarine may be used as a training boat. The decision was made, therefore, to designate the submarine type under construction according to the name of the second boat, the Zeelev, which is being completed and outfitted afloat.

Submarine classification	Displacement (tons)	Date Disposition 1960	Type 1960	Speed 1960 knots 10/60	Driving range (miles) 1960 at a speed of 10 knots 10/60	Crew	Armament
G R E A T B R I T A I N							
Hoplite	2300/2400	7/60	1. Sub. grn. (-) 10/60	17	11	110 100 (10 torpedoes)	
W E S T G E R M A N Y							
2000/1200	2100/1200	7/60	1. Sub. grn. (100) 10/60	17	11	110 100 (10 torpedoes)	
2000/1200	1300/1200	7/60	1. Sub. grn. (100) 10/60	17	11	8 533-mm torpedoes 1000 (10 torpedoes)	
2000/1200	2200/1200	7/60	1. Sub. grn. (100) 10/60	17	11	8 533-mm torpedoes 1000 (10 torpedoes)	
2000/1200	1400/1200	7/60	1. Sub. grn. (100) 10/60	17	11	8 533-mm torpedoes 1000 (10 torpedoes)	
D30	1000/1200	7/60	2. Sub. grn. (100) 10/60	17	10-11	8 533-mm torpedoes 1000 (-)	
TR1000	-	7/60	- 10/60	17	11	8 533-mm torpedoes 1000 (12 torpedoes)	
TR2000	2100/2300	7/60	1. Sub. grn. (100) 10/60	17,000/100 10/60	30-35	8 533-mm torpedoes 1000 (12 torpedoes)	
TR3000	-/2300	7/60	1. Sub. grn. (100) 10/60	17,000/100 10/60	30	-	
F R A N C E							
CA	2000/1500	7/60	1. Sub. grn. (-) 10/60	17	12-13	8 533-mm torpedoes 1000 (12 torpedoes)	
CD	2500/2740	7/60	4. Sub. grn. (-) 10/60	14,000/- 10/60	75	8 533-mm torpedoes 1000 (12 torpedoes)	
N E T H E R L A N D S							
Haven 1100	1200/1100	7/60	- 10/60	10000/100 10/60	25	8 533-mm torpedoes 1000 (10 torpedoes)	
Haven 1400	1310/1400	7/60	-	10000/100 10/60	30	8 533-mm torpedoes 1000 (10 torpedoes)	
Haven 1800	1800/1800	7/60	- 10/60	17,000/240 10/60	40	8 533-mm torpedoes 1000 (10 torpedoes)	
Sea Oregon	2370/2800	7/60	2. Sub. grn. (100) 10/60	18,000/200 10/60	47	8 533-mm torpedoes 1000 (14 torpedoes)	
Walrus	2400/2800	7/60	1. Sub. grn. (100) 10/60	18,000/200 10/60	50	4 533-mm torpedoes 1000 (8 to 10 torpedoes), (10 torpedoes)	
S W E D E N							
Vestergatland	2070/2100	7/60	1. Sub. grn. (-) 10/60	17	21	8 533-mm torpedoes 1000 (10 torpedoes), surface (10 torpedoes)	

TABLE 1 Main Tactical-Technical Characteristics of New Diesel Submarines.

The Netherlands has also begun construction of submarines for export, to Taiwan in particular. Export versions Moray 1800, 1400 and 1100 have been developed to take into account the requirements of Indonesia, Mayaysia and Thailand.

**Norway.** Norwegian naval forces intend to modernize nine of the 14 Kobben-type submarines remaining in the fleet (three of the modernized boats will be sold to Denmark), and replace the others with six new Ula-type submarines (design 210/6071), to be built by the West German firm TNW and delivered to the Norwegian naval forces in the 1989-1992 time frame. The lead submarine is being laid down in the city of Emden. It has a crew of 20 men; its armament includes eight torpedo launchers. Sections of the other five Ula submarines will be assembled in Norway. Norwegian specialists have tested a hydro-acoustic polymer antenna made of PVDF, a material they believe will be used on the new boats. The submarine named Ula has been renamed Kin.

**Denmark.** The Danish naval forces have two Delphinentype submarines (delivered to the fleet in 1959 and 1964) and two Narvalen-type boats, built at the end of the 1960's. The Narvalens are presently undergoing modernization. Three Kobben-type submarines were purchased from Norway and will enter the Danish fleet inventory in the 1987-1989 time frame.

**Greece.** The Greek navy is the first to order submarines produced by West Germany. In 1967 they ordered four boats of design 209/1100, and in 1975, another four (design 209/1200). In all, the Greek navy has 10 submarines in its fleet, including two Balao-type boats obtained from the United States in the 1940's.

**Turkey.** The Turkish navy is developing a very substantive submarine force (the fleet includes 19 diesel submarines). Beginning with 10 Balao-type and 2 Tango-type boats obtained from the United States, 3 209/1200 design submarines were supplied by West Germany in the middle of the 1970's. Turkey then effected transition to construction of another 3 boats of this design at its own shipyards in Golcuk. The next stage will entail outfitting the fleet with 6 209/1400 design submarines with great displacement. The first of these is to be ordered by the West German firm HDW; the remainder will be built in Turkey. According to foreign press reports, the total number of Turkish submarines, taking into account those which will be removed due to obsolescence, will reach 20.

**Spain.** After completion in 1986 of four Galerna-type submarines at the Bazan shipyard (of the French Agosta design), Spain's naval forces include eight submarines. Four Delphin-type boats (similar to the French Daphne) constructed at the beginning of the 1970's are undergoing modernization. Various designs are being examined as prospective candidates for the next series of submarines, to be built in the beginning of the 1990's.

**Portugal.** The naval forces of Portugal have three Daphne-type submarines, supplied by France at the end of the 1960's.

**Sweden.** The naval forces of Sweden include 12 submarines, of which 5 of the Shoreman type built at the end of the 1960's have been modernized and will remain in the fleet until the mid 1990's. Sweden's modern submarines include three Nekken-type boats, characterized by two extra 400-mm torpedo launchers for small torpedoes (in addition to the generally accepted 533-mm launchers). In 1987-1989 the Kokums firm will supply the fleet with four Vestergeutland-type submarines (design A17). Design A19 is under development and will entail construction of new submarines to replace the aging Shoreman variety.

**Japan.** A program for construction of 10 Iyusiu-type submarines is nearing completion (displacement—2200 tons; armament—533-mm torpedo launchers with basic load, Harpoon missiles equipped with SQS-36 active hydro-acoustic system and ZQQ-4 passive system; ZPS-6 radar; crew—80 men). The Japanese fleet presently includes 15 submarines: 8 Iyusiu and 7 Udzusius-type.

**Taiwan.** The Taiwanese naval forces have two submarines in all, old boats of the Balao type obtained from the United States in the 1940's. Two modern Seadragon submarines were ordered by Taiwan's defense ministry from the Vlinton-Feyenoord corporation in the Netherlands and are under construction. It had been planned to purchase six of these boats but political considerations forced the Netherlands government to discontinue construction of the remaining four. Foreign observers note in this regard that Taiwan is capable of building its own submarines. It is known, for example, that the China Steel Corporation is producing the high-strength HY-100 steel used in submarine shipbuilding.

**Indonesia.** The Indonesian naval forces have two 209/1300-design submarines, supplied by West Germany in 1981. According to foreign press reports, Indonesian shipyards are capable of constructing up to 10 such submarines and exporting a portion to other member nations of ASEAN.

**Pakistan.** The naval forces of Pakistan include six Daphne and Agostra-type submarines built in France in the 1960's and 1970's correspondingly.

**Australia.** A program has been approved for construction of six submarines with displacement of about 2200 tons to replace in the 1990's six Oberon submarines presently in the fleet inventory which were constructed by Great Britain. Valued at 2.6 billion Australian dollars, the program envisages submission of competitive project designs from Australian, West European and American corporations, and subsequent construction, testing and trials of the six boats over a 12-year period. Sixty percent of the work volume is to be accomplished by Australian

industry. Lay-down of the lead submarine is planned for 1987-1988 and completion of construction, for 1991-1992. The program also calls for creation of a production capacity in Australia to be used for future construction of ships and submarines for export.

Submitted in the competition were the IKL2000 West German design and Swedish 47/1 (one of the design requirements was a cruising range of not less than 10,000 miles). Sweden's design envisages outfitting the boats with Stirling engines. The hydro-acoustic and radio-electronics equipment, also competitively selected, is being developed by two international corporate conglomerates headed by the American Rockwell firm and the Netherlands' Hollandze Signaal Apparaten. As a result of the competition, preference has been shown to the Swedish design.

**Israel.** The Israeli Defense Ministry conducted negotiations with the American firm Todd Shipyards regarding assistance in the preparation of Israel's shipyards (in the city of Haifa) for assembly of three submarines of West German design. It is expected that the main body sections will be manufactured in the FRG. These boats will supplement three presently in the fleet inventory built by the Vickers corporation of Great Britain in 1977 (West German 206 design).

**Republic of South Africa.** The South African navy has three Daphne-type submarines of French construction, outfitted with the most modern electronics, and is persistently seeking a nation to supply it with modern submarines. Press reports state that South Africa has succeeded in acquiring project and design documentation from the West German firm HDW.

**Argentina.** In 1984 and 1985 Argentina's naval forces acquired two TR1700-design submarines, built by the West German firm Tissen Nordseewerke (TNW), in addition to the two 209/1200-design boats built in the FRG in the 1970's. Another four of this design are under construction in Buenos Aires.

**Brazil.** The naval forces of Brazil include seven submarines: four Balao (acquired in 1973 from the United States) and three Oberon boats, built in Great Britain at the beginning of the 1970's. Following delivery of the first 209/1400-design submarine, being built in the city of Kiel (FRG) by Howaldswerke Deutsche Werft (HDW), another three boats of the same type will be assembled at the naval shipyard in Rio-de-Janeiro. It is believed that Brazilian naval forces may obtain a total of 10 submarines of this design. In addition, the possibility of acquiring a large-displacement (up to 2700 tons) boat is under study. A nuclear reactor prototype is being constructed at Sao Paulo University for this purpose. Brazilian representatives estimate this will be under development 5-10 years. According to other information, construction

of a submarine (of the Netherlands' Walrus design) equipped with conventional power system may begin in Rio-de-Janeiro in 1990, to be replaced probably later on by a nuclear unit.

**Venezuela.** The naval forces of Venezuela have one U.S.-manufactured Balao-type submarine (acquired in 1973) and two 209/1300-design boats purchased from the FRG in 1976-1977. They intend in the next two years to submit an order to the HDW firm for construction of one or two more.

**Columbia.** Two 209/1200-design submarines delivered in 1975 from West Germany will undergo modernization in the coming years. In addition, Columbia's naval forces include two extremely small (displacement 70 tons) SX-506 submarines built in Italy at the beginning of the 1970's.

**Peru.** Peru's naval forces include 12 submarines: six of U.S. construction in the 1940's and 1950's (two Balao and four Mackeral), and six 209/1200-design purchased from West Germany over the period 1974-1980.

**Chile.** Chile's naval forces include two Oberon submarines (supplied by Great Britain in the mid 1970's and two 209/1400-design boats delivered from West Germany at the beginning of the 1980's.

**Ecuador.** Ecuador's naval forces received two 209/1300-design submarines from the West German firm HDW at the end of the 1970's.

(To be continued)

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9768

#### Communications Possibilities Using Neutrino Clusters

180100411 Moscow ZARUBEZHNOYE VOYENNOYE OBOZRENIYE in Russian No 10, Oct 87 (signed to press 5 Oct 87) pp 57-59

[Article by Captain 1st Rank E. Viktorov and Major S. Aleksandrin, candidate of military sciences: "Communications Possibilities Using Neutrino Clusters"]

[Text] One example which clearly demonstrates the Pentagon's striving to use the newest scientific and technological achievements for military purposes is the conduct in the United States at its behest of scientific research efforts examining the possibility of creating communications systems of a fundamentally new type—using the neutrino. American military experts believe such a system can provide reliable communications with submarines (primarily the nuclear missile variety) in their submerged state.

The basis in physics for neutrino communications is as follows. The neutrino is an elemental particle having no electrical charge and a rest mass close to zero. These characteristics are responsible for its tremendous penetrating capability. The particle would be capable of penetrating a million planets similar to the Earth lined up in a row without once interacting with matter. Stars are giant natural sources of neutrinos, where thermonuclear reactions are constantly taking place. Examples of artificial neutrino sources can be found in nuclear reactors, thermonuclear devices, and charged-particle accelerators. Specifically, a high-energy (up to a level of several hundred giga-electron volts; one GeV- $10^9$ eV) proton accelerator can produce a narrow-beam (having a divergence of several milliradians) cluster of neutrons.

To produce such a cluster the protons are accelerated, then directed to a metallic target in the accelerator. This results in the formation of a current of various elemental particles, to include pions and kaons ( $\pi$ - and  $K$ -mesons). The latter decompose after a short period of time into muons and neutrinos. Insofar as all these particles except the neutrino are intensely absorbed by matter, a cluster consisting only of neutrinos will be found a certain distance from the accelerator. The accelerator may be constructed in such a way as to direct the neutrinos produced under its influence to certain regions of the Earth carrying encrypted information.

One of the basic problems seen in the practical application of neutrino communications lies in difficulties associated with reliably detecting the neutrino, since the probability of its interaction with matter is extremely small. Special detectors must therefore be used. According to American experts, certain sectors of the open ocean or sea might be used in this regard. Detection modules could be positioned in water volumes of  $10^6$  -  $10^8$  tons or more, comprising a system of optical sensors based on photoelectronic multipliers. The operating principle of such a detection system involves the registration of Cherenkov-Vavilov radiation generated by currents of high-energy elemental particles arising whenever neutrinos interact with neutrons or protons in the water. This radiation is propagated in clear water out to a distance of about 20 meters, and it is precisely at this distance that the detection modules should be separated one from another. The phenomenon caused U.S. naval experts to consider the possible use of neutrino clusters for communicating with nuclear submarines submerged at great depths. Studies have been underway at the Naval Scientific Research Laboratory in Washington since the mid 1970's to examine the possibility of developing such a communications system (see diagram). Specialists from several American universities have taken part in this effort.

According to foreign press reports, successful experimentation was conducted in the United States as early as 1978 with the aim of demonstrating the basic possibility of neutrino communications. Neutrino clusters with energy levels of 400 GeV were produced in a proton

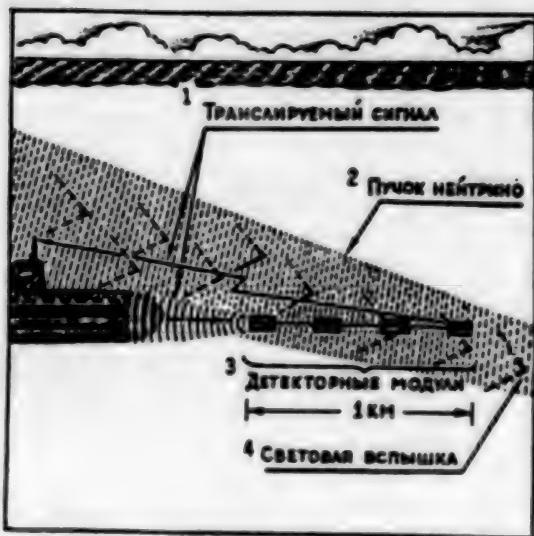


FIGURE 1 Communications System Using Neutrino Clusters

Key:

1. Transmitted signal
2. Neutrino cluster
3. Detector modules
4. Light flash

accelerator at the Fermi National Laboratory in Batavia, Illinois, and directed to three detectors, each containing 1890 liters of water and positioned 6.5 km. from the accelerator. Similar experiments were conducted in 1982-1983 at a distance of 2750 km (the neutrino detectors were located in the state of Washington).

At the same time that the physical basis of neutrino communications is under development, possible methods of transmitting information are being examined. It has been established that the speed of information transmission is directly proportional to the volume of water in which the neutrino is detected and to the cube of the energy of the neutrino. For a given speed of information transmission, therefore, the basic method of decreasing the required volume of water in the detector is through the use of the most powerful accelerators possible. It is worthy of note in this regard that, according to Western press reports, efforts have been conducted in the United States to increase the power of the proton accelerator at the Fermi National Laboratory so as to attain terminal proton energy levels of up to one tera-electronvolt (1 TeV- $10^{12}$ eV). But even at such a power level, the reliable detection of neutrinos requires a detector of significant capacity, impossible to situate inside a submarine. Theoretical computations performed by experts show that in order to create a communications channel to transmit just one bit per second a distance of 10,000 km, using a proton accelerator with energy level of 1 TeV would require a detector water volume of  $10^8$  tons.

Experts consider one of the likeliest ways of solving this problem to be situating the detector outside the body of the submarine. To receive communications, several cylindrical detection modules connected in series and filled with sea water would be ejected from the submarine's torpedo launchers. Optical sensors mounted inside them would locate and record light flashes occurring in the water as the neutrino clusters pass through. Transmission of signals from the detection modules to the submarine may be accomplished in a variety of ways, to include their intermediate transformation into audio signals for reception at the hydro-acoustic station or into light signals directed towards the submarine's periscope. In this instance the relatively small weight of water in the detector will result in a low speed of information transmission, but this will be quite sufficient for effecting the transmission of certain important commands, missile launch for example.

Among the especially valuable features presented by neutrino communications, American experts see a high degree of secrecy (chiefly due to the low divergence of the neutrino cluster) and high resistance to various artificial sources of interference and jamming. They believe its main shortcomings to be its great complexity, the high cost of constructing a powerful accelerator appropriately equipped for directing neutrino clusters to desired regions of the Earth, and the low stability of neutrino communications near the water's surface due to natural background radiation.

U.S. experts calculate that practical communications for command and control of nuclear missile submarines on patrol using neutrino clusters will be possible when proton accelerators of 20-30 TeV capacity are built. It has been noted in the foreign press that the United States is conducting scientific research efforts on a broad scale to develop economical and small accelerators having power capacities up to 20 TeV. Successful accomplishment of such a project will enhance the possibilities for development and use of neutrino communications in command and control of the strategic offensive sea-based forces of the United States Navy.

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9768

**Commando Units of the Italian Navy**  
*18010041m Moscow ZARUBEZHNOYE VOYENNOYE OBOZRENIYE in Russian No 10, Oct 87 (signed to press 5 Oct 87) pp 59-61*

[Article by Lieutenant Colonel B. Balushevskiy: "Commando Units of the Italian Navy"]

[Text] The naval forces command of Italy, one of the most active member nations of the aggressive North Atlantic bloc, considers commando units to be one of the necessary components of its naval forces. The journal

Navy International reports that the missions to be accomplished by these units include reconnaissance and destruction of warships and transport ships in naval bases and ports, command and control points, shore-based radar, communications centers and networks, radar and electronics battlefield surveillance stations, anti-assault-landing defensive facilities, underwater pipeline and cable. They engage in combat with enemy frogmen and underwater demolitions specialists, and perform underwater rescue and maintenance/repair work.

According to foreign press reports, the Italian navy has established a commando-frogman command group, "Tezeo Tezey," to accomplish these missions. Directly subordinate to the main naval forces headquarters, this command is located near the city of Spezia.

Organizationally, Tezeo Tezey consists of a detachment of navy frogmen, commandos and divers (two operational groups), groups of support ships, and training and research centers.

The operational commando group includes the combat unit and technical maintenance unit. The total number of commandos is about 200. They operate in groups of 2 to 12 men. They are outfitted with small arms and special weapons. Their small arms include Beretta 92 pistols, Beretta M12 and MP-5 machine pistols (usually the noiseless variety), the 11.43-mm Colt M3 machine pistol, 5.56-mm Beretta SCS-70/90 carbine and AR-70/90 automatic rifle, 7.62-mm G3 SC/1 automatic sniper rifle and SP-66 Mauser, the new SPAS-15 carbine, 7.62-mm MG-42/59 general-purpose machine gun, automatic 40-mm Heckler and Koch grenade launcher, and 82-mm Belgian RL-83 Blindicide anti-tank rocket launcher. Their special weapons include the five-charge P-11 Heckler and Koch electron pistol for firing underwater, explosive charges (5 and 0.2 kg) with time-delay operation of up to seven minutes, V-40 hand grenades.

The operational group of navy frogmen and divers also consists of combat unit and technical maintenance unit. The frogmen and divers are divided into two sections. The first is outfitted with conventional frogman's equipment (aqualungs); the second utilizes deep-water systems, diving bells, extremely small submarines and equipment with special breathing mixtures.

The operations of the navy frogmen and divers are supported by a group of support ships: "Ansteo" rescue ships (with deep-water equipment capable of conducting rescue operations with submarines at depths of up to 300 meters, decompression chamber, and frogman's diving bell) and "Proteo" rescue ships (with frogman's diving bell capable of submergence to depths of up to 200 meters), "Kavetaale" mother ship for the navy frogmen, and the "Marino" and "Pedretti" support launches.

A training center provides training for Tezeo Tezey personnel as well as specialists of the other services of the armed forces and the police. It is comprised of three schools: frogman, commando, and military facilities guard.

The frogman school is the only training institution in Italy which issues its graduates a license for conducting underwater operations. It trains regular frogmen and deep-water specialists. The regular frogman training is conducted with military conscripts and lasts 18 weeks. Deep-water training is provided extended-service regular duty personnel in a six-month training program. In addition, other courses are offered at the school. The student-instructor ratio never exceeds four to one.

Only officers and extended-service regulars train at the commando school. The 10-month program includes training in the following areas: tactics of commando operations; combat equipment, weapons and ammunition; alpine and frogman training; special methods of attack and self-defense while unarmed and using improvised weapons. Parachute training is conducted in the city of Pisa, where students also train in conducting assault landings from helicopters using a variety of methods. After completing the basic training course, students undergo a 14-month training period in combat units. The commando school also trains specialists for clearing mines at the assault landing zone for the "San Marco" marine battalion (two-and-a-half months).

The Tezeo Tezey frogman/commando research center conducts studies in the sphere of underwater equipment, armament and weapons used by navy frogmen and commandos of the Italian naval forces.

Combat training of intelligence and commando units is conducted under the auspices of the combined NATO naval forces in the Southern European theater and the main headquarters of the Italian navy. The chief training area used by the Tezeo Tezey command is the region of the island of Tino, near the Spezia naval base.

According to foreign press reports, a typical commando operation consists of three stages: reconnaissance of the objective and movement to it; seizure and destruction of the objective; withdrawal. Two groups are formed to effect mission accomplishment: capture and fire support. The capture group (six men) drops into the sea from helicopters at night, then uses its frogman equipment and extremely small submerged craft to get to shore. It then moves to the objective. The fire support group (ten men) lands on shore from ship or submarine (using inflatable boats). The capture group is armed with one machine-pistol and pistols with silencers, explosives having various types of fuses, and hand grenades. The fire support group has three MG-42/59 general-purpose machine guns and a rocket launcher with three rockets. The crew for each weapon consists of two men. The remaining two men (rock-climbing specialists) reconnoitre the objective, lead the fire support group up from the

water's edge and back (during the withdrawal). The pistols with silencers are used to eliminate guards posted at the objective. A rocket is fired at an element of the objective's defense system to signal the start of operations, after which the fire support group opens fire with machine guns on the guardroom of the defense. The capture group destroys the objective. A second rocket is fired and explosives set off to signal the withdrawal. The fire support group covers the capture group's withdrawal, usually towards the sea.

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9768

**The Financing of Weapons System Development Programs for U.S. Strategic Offensive Forces**  
*1807004 In Moscow ZARUBEZHNOYE VOYENNOYE OBOZRENOYE in Russian No 10, Oct 87 (signed to press 5 Oct 87) pp 63-69*

[Article by Lieutenant Colonel N. Makarov: "The Financing of Weapons System Development Programs for U.S. Strategic Offensive Forces"]

[Text] Practical actions taken by the U.S. administration in building up its arsenal of strategic offensive weapons in violation of the SALT II agreement are fraught with serious consequences for international security. They clearly reveal to the entire world the true face of American imperialism and its aggressive essence.

The refusal of the Reagan administration to observe the provisions of SALT II is the factual result of the entirety of its activities beginning in 1981. From the very first days of that administration's accession to power, it froze the ratification of SALT II and simultaneously (in clear violation of the agreement) set about the task of deploying long-range cruise missiles and stationing intermediate-range ballistic missiles in Europe. Moreover, a plan was announced in October 1981 for the modernization of strategic forces, opening up a new phase of the strategic arms race.

It was proposed in accordance with this plan to develop and deploy at the end of the 1980's, beginning of the 1990's, qualitatively new strategic offensive weapons based on land, sea and in the air. According to the Congressional Office of Management and Budget, implementation of this plan would require allocations of \$250 billion over fiscal years 1984-1988 alone.

The Reagan administration's accession to power brought with it a sharp increase in amounts of monies allocated in the defense budget for strategic programs. Thus, whereas \$37.6 billion was allocated for the strategic forces program for the period 1977-1980, \$73.8 billion was the amount allocated over the first four years of the

Reagan administration (1981-1984). Planning for the subsequent Reagan years (1985-1988) called for \$105 billion to be directed to strategic forces spending.

In the area of scientific research and experimental design work associated with the development of strategic weapons systems, \$21.7 billion was spent over the period 1981-1984; another \$35.7 billion is programmed for the remaining four years.

Budget allocations of the U.S. Department of Energy for military programs for the development and production of nuclear explosive components over these two terms of the Reagan presidency amounted to \$19 billion and \$30 billion respectively.

Active efforts are underway to expand the "Strategic Defense Initiative (SDI)" proposed by President Reagan in his notorious "star wars" program. Just over the period FY 1985-1988, \$14.5 billion is proposed for it. The cost of the entire program exceeds \$2 trillion.

This kind of prolific spending is related to reactivated attempts on the part of the United States to achieve strategic superiority over the Soviet Union.

Qualitative development and improvement of land-based missile forces is one of the areas in which the United States plans to modernize its strategic offensive forces. It is within this framework that a number of programs for developing and modernizing strategic weapons systems is being financed.

The program for development of the MX land-based strategic missile system. From the very beginning, the United States assigned this system a special role. In the first place, the MX missile should significantly enhance the capability of the land-based component of the strategic triad to deliver nuclear warheads. Secondly, it should replace the Titan-2 ICBM and a portion of the Minuteman-3 missile force. The MX is equipped with a multiple reentry vehicle system having 10 independently targetable warheads, whose circular error probable is half that of the Minuteman-3 ICBM equipped with a multiple reentry vehicle housing three warheads.

Financing for the program of scientific research and experimental design work began in 1974. About \$500 million was allocated for the conduct of an experimentation effort continuing until 1979. In September 1979 a decision was made to begin full-scale development of the MX ICBM. Over the period FY 1980-1986 \$10.2 billion was allocated to this end.

Financing for MX production has been ongoing since 1984. The program envisages procurement of 223 missiles. Over the period FY 1984-1987, about \$5.7 billion was allocated for the purchase of 66 ICBM's. Scientific research with respect to basing modes for the MX was conducted simultaneously with development of the missile (\$0.7 billion was spent on this program through

1981). As a result of a study of about 30 possible basing variants conducted by a specially appointed commission, it was proposed to station 100 missiles in Minuteman-3 ICBM launcher silos. In 1985 Congress adopted a resolution amendment providing for the stationing of only 50 ICBM's in this manner, and for the deployment of the remainder to be postponed until the beginning of the 1990's. The cost of the entire program is estimated to be \$26-28 billion (at current prices).

According to foreign press reports, the first 10 MX missiles were placed on operational alert in their Minuteman-3 launch silos in December 1986. A mobile basing variant is being examined for the remaining 50 missiles, for which financial allocations on the scientific research and experimental design effort in the Department of Defense budget for FY 1988 and 1989 are expected to be \$0.6 and \$1.3 billion respectively.

The data which has been compiled here with respect to financing just one U.S. Department of Defense program shows, on the one hand, the complexity of the modern weapons systems and, on the other hand, the great volume of unproductive expenditures by the society, squandered to benefit only the interests of the military-industrial complex and the unfeasible dream of attaining military superiority.

The Midgetman ICBM program. In April 1983 the Commission on Strategic Forces created at the President's initiative recommended in its proposals on ways to further develop these forces that efforts begin to build a new Midgetman land-based mobile ICBM with monoblock warhead. Deployment of these missiles is expected to begin early in the 1990's.

The program for Midgetman development envisaged scientific research and experimental design work to be conducted in two stages. For the experimental development stage, lasting until the beginning of 1987, contractors were selected for appropriate system components. The full-scale system development stage, expected to begin in FY 1987, calls for the planning and conduct of ICBM testing.

Monies allocated by the FY 1984 budget for the Midgetman program amounted to \$0.5 billion. The U.S. Air Force planned to use this money for development of the missile itself, the launcher-transport complex, and basing modes, for which they began issuing orders to corporations as early as the end of 1983.

In July 1985 the U.S. Department of Defense selected the Martin Marietta Corporation as chief contractor for development of the ICBM and concluded two contracts with it for a total of about \$450 million. These funds would provide for construction of experimental Midgetman prototypes and their design and flight testing (beginning in 1988).

For a long time the air force was unable to select a deployment variant for the Midgetman ICBM. Upon concluding the contractual arrangements for this program, the corporations had to determine their required expenditures for deployment of 250, 500, 750 and 1000 missiles. According to approximate estimates by the President's Main Budget Control Administration, the deployment of 500 missiles based in unprotected launcher-transporter complexes dispersed over a large area would result in construction and operations expenditures amounting to \$43 billion; for defended launcher-transporter complexes—\$44; and for well-defended silo complexes—\$49 billion (in 1982 prices). The final Midgetman basing variant has now been selected: mobile deployment at defended launcher-transporter complexes.

The Congressional Office of Management and Budget has estimated that the deployment and operation over a 20-year period of 1000 Midgetman ICBM's will cost about \$107 billion (at current prices) and will require about 50,000 individuals for maintenance and servicing.

**The modernization program for Minuteman-2 and Minuteman-3 ICBM's.** The Minuteman-2 and -3 constitute the main type of missile in the U.S. inventory of land-based strategic missile forces. These started coming into the inventory at the beginning of the 1960's and their deployment was completed in 1975. According to foreign press reports, 450 Minuteman-2 and 540 Minuteman-3 ICBM's were standing operational alert at the beginning of 1987. Overall expenditures for development and procurement of 655 Minuteman-2 and 834 Minuteman-3 ICBM's amounted to about \$13 billion.

The Minuteman-2 and -3 modernization program has been effect since 1971. Efforts were made during the early stages of their operation to develop and improve the guidance systems. This work was completed in 1978. A new multiple reentry vehicle, the Mk 12A (three warheads, each having a yield of 335 kt) was developed over the course of the modernization program and was mounted on 300 Minuteman-3 ICBM's. This cost the Department of Defense \$500 million.

Modernization of Minuteman systems continues today with the aim of extending their operational life. The program envisages replacement of silo and launch control equipment at all six ICBM sites (Malmstrom, Ellsworth, Minot, Whiteman, Warren and Grand Forks air force bases).

The program is scheduled to extend for six years and involve total expenditures of \$500 million. It will provide increased reliability and security, and enhance other operational features of the weapons system. The cost of the first phase of this effort (1985-1988) will be approximately \$170 million.

U.S. Air Force specialists believe that the Minuteman-2 and -3 ICBM's will remain in the inventory of land-based strategic missile forces until the end of this century.

**The program for development and deployment of the Pershing-2 intermediate-range ballistic missile (IRBM).** According to the official U.S. classification system, missiles of this category are not a part of strategic offensive forces. However, their deployment on Western European territory transforms them into first-strike weapons.

The West German government announced in late 1985 that American Pershing-2 IRBM's had been deployed in that country's territory—108 launcher-transporter complexes with missiles had been stationed at three bases.

The chief contractor for development and production of these IRBM's was the Martin Marietta corporation, which began full-scale development in 1979 based on a \$360 million contract for work to be conducted over the course of 57 months. Contracts totalling \$105 million were signed with the firm for the organization of production and manufacture of the first set of 21 missiles in 1982. Total expenditures for missile development and deployment amounted to \$2.6 billion.

A total of 156 Pershing-2 missiles were delivered to West Germany—108 to be stationed in launcher-transporter complexes and the remaining 48 to be stored in warehouses. Additional funds were allocated in FY 1986 for the acquisition of 54 missiles. The total complement of IRBM's purchased numbers 308, including those used in training.

**The program for development and deployment of ground-launched cruise missiles (GLCM).** Ground-launched cruise missiles, which are being deployed in Great Britain, Italy, Belgium, West Germany and the Netherlands (464 missiles in all) are, like the Pershing-2 IRBM's, first-strike weapons.

The General Dynamics firm has been developing these cruise missiles since 1978 at an overall cost of almost \$400 million. GLCM purchasing began in 1981. The program envisages purchase of over 600 missiles, including those to be used in flight testing. Program expenditures for GLCM development and deployment are estimated as totalling \$3.8 billion.

An important position in the planning effort to modernize strategic offensive forces has been relegated to the development of new strategic bombers and the air-based weapons systems they will employ.

**The program for development of the strategic B-1 bomber.** According to foreign press reports, B-1B aircraft continue to enter the inventory of Strategic Air Command (SAC) units. The first B-1B squadron was formed at the end of 1986.

The program for building strategic B-1 bombers began in the beginning of the 1970's. Rockwell International and General Electric (for the airframe and engines respectively) were selected as the chief contractors. President Carter cancelled the program in 1977. By that time expenditures had already amounted to \$4.5 billion. Efforts were conducted in subsequent years to study alternative variants for a prospective bomber.

During discussions of the Department of Defense draft budget for FY 1981, the Congress proposed a program be initiated to examine long-term prospects for the strategic bomber. A total of about \$260 million was allocated to studies of possible strategic bomber alternatives in replacing the B-52. Over the course of selecting the final variant a proposal was made to purchase about 100 B-1 bombers and develop the Advanced Technology Bomber (ATB) with "stealth" technology.

In 1981 the Reagan administration approved a program for purchase of 100 B-1 bombers. The FY 1982 budget allocated \$1.6 billion to the air force for this purpose and another \$0.5 billion for scientific research and experimental design work. In January 1982 Rockwell International received \$0.9 billion to organize production of the first aircraft and long-term manufacture components of a set of 17 aircraft to follow. Another contract was signed with this firm at the same time for \$1.3 billion to develop the final variant of B-1B for flight testing.

As early as FY 1983 \$4.8 billion was allocated for the B-1B program, of which \$4 billion was for the purchase of seven aircraft. In 1986 the Department of Defense directed \$5.1 billion to begin production of the last 48 B-1B's. In all, \$24.3 billion was spent for the acquisition of these bombers. Cost of the entire program totals \$28 billion.

The ATB program. The Department of Defense is carrying out long-range development of a new bomber which will employ the latest achievements of science and technology in an environment of total secrecy. The Northrop Corporation is the chief contractor. Development of this bomber is yet one more attempt by the Pentagon to attain military superiority over the Soviet Union.

The program for research, development and production of 132 ATB bombers (which have come to be known as B-2) will cost roughly \$36.6 billion (in 1981 prices). The average cost of a single aircraft is \$277 million (for comparison purposes, the cost of a B-1 bomber is \$265 million).

At the same time that efforts are on-going to develop two new types of strategic bomber (B-1B and B-2), the Department of Defense is continuing to modernize its B-52 bombers which have been in the SAC inventory since the mid-1950's.

The B-52 bomber modernization program has been underway since 1979. The first squadron of B-52G bombers, outfitted with cruise missiles, became operational in the air force in December 1982. They are stationed at Griffiss Air Force Base, New York. In December 1986 the 131st B-52 heavy bomber, armed with long-range cruise missiles, entered the inventory of strategic offensive forces. This was a direct violation of the SALT-2 agreement, which permitted the United States to have no more than 130 such aircraft.

Modernization of various modifications of the B-52 bomber is proceeding in several directions. It is planned to rearm almost 200 B-52G and -H versions as cruise missile carriers. Funds were allocated prior to 1983 to arm 105 B-52G aircraft with cruise missiles (externally suspended); later allocations were made to accomplish this for 92 B-52H models. Total cost of this rearmament was approximately \$1.3 billion.

Planning called for completion in 1984 of the first phase of installation of new electronic equipment for the weapons guidance systems on 268 B-52G and -H aircraft. Expenditures for this phase totaled \$1.6 billion. Electronic equipment replacement work in the second phase will require another \$2 billion.

Plans have been underway since 1984 to modernize various systems of the aircraft with the aim of reducing the effect of electromagnetic pulsing on them. This work will cost \$1 billion.

Efforts to perfect the radar systems on the B-52G and -H began in 1984 and will cost \$400 million.

The modernization program also envisages a series of measures to improve the aircraft's technical and operational characteristics. It has been reported in the foreign press that the cost of the entire program of B-52 modernization will reach \$8 billion.

The program for development of air-launched cruise missiles (ALCM) was conducted from 1974 through 1980 on a competitive basis between the Boeing and General Dynamics corporations. After completion of flight tests in March 1980, a Boeing model (designated the AGM-86B) was selected as the basic version for continued development. The decision to begin series production of the ALCM was made in April of that same year. It was originally planned to purchase 3424 cruise missiles; the approximate cost of the entire program was estimated at \$4.2 billion. Aircraft cost and quantity indices were examined repeatedly during the course of program implementation. The decision was made in 1983 to discontinue purchase of this ALCM in 1984. Acquisition of 1763 missiles had been sanctioned by this time and the total amount of funds allocated for the program had reached \$4 billion.

The ALCM production program was almost curtailed twice due to the development of second-generation missiles with "stealth" technology.

Like the ATB program, the program for development of the Advanced Cruise Missile (ACM), a second-generation air-launched cruise missile is progressing in an environment of total secrecy. The Advanced Cruise Missile will be used first and foremost as armament for the B-1B strategic bomber.

Foreign experts estimate that ACM development will require more than \$1 billion prior to 1990. Allocations of \$1.5 billion will be made for cruise missile purchases over the first two years. The number of missiles procured will reach 1300 (\$3 million per missile) and the cost of the entire program will come to approximately \$7 billion.

Program for development of the SRAM-2 surface-to-air guided missile. The SRAM-2 with nuclear warhead has been under development for installation on the new B-1B and B-2 bombers since 1985. As early of February of that year the U.S. Air Force submitted orders to three corporations—McDonnell Douglas, Martin Marietta and Boeing Aerospace (\$4.5 million each)—for a 10-month project to determine system configuration.

In December 1986 a contract was concluded with Boeing Aerospace for full-scale development. Although the Department of Defense budget request sought \$164.7 million in FY 1987 to finance the first phase of scientific research and experimental design work for this project, Congress approved only 40 percent of the Pentagon's request. Allocations of \$220-230 million per year have been made for this program in FY 1988 and 1989.

As reported in the foreign press, SRAM-2 production is scheduled to begin at the end of 1988, beginning of 1989; deployment is planned for the beginning of the 1990's. The program for development of the SRAM-2 is estimated to cost approximately \$3.1 billion. It is intended to procure a total of 1633 missiles.

The program for modernization of sea-based nuclear forces being implemented by the Pentagon is one of the most expensive military programs of recent years. The chief element of the modernization plan is development of the Trident underwater nuclear missile system. During the course of implementation of this program, Trident-1 ballistic missiles and nuclear submarines of the Ohio variety have been developed and accepted into the inventory. Development of a new ballistic missile, the Trident-2, is currently underway.

Development of the Trident-1 submarine-launched ballistic missile took place from 1968 through 1977. The missile was built by the Lockheed Corporation. \$3.7 billion was allocated to conduct scientific research and

experimental design work (for comparison purposes, development of the Poseidon SLBM, an armament earlier in the inventory, cost \$1.8 billion).

Financing for Trident-1 procurement began in 1976 and continued until 1985. In all, 570 SLBM's were purchased at a total cost of \$7 billion (procurement of 619 Poseidon-C3 missiles cost the navy \$2.5 billion).

The re-equipping of Lafayette-class submarines with Trident-1 missiles to replace the Poseidon-C3 took place from 1977 through 1982. The total program cost to re-equip 12 submarines came to \$4 billion.

Beginning in 1981 the new Ohio-class submarines began being outfitted with Trident-1 missiles. Development of this submarine began in 1969. More than \$1 billion was allocated to this program. Construction of the new submarines has been financed since 1973. In all, eight Ohio-class nuclear submarines have been equipped with the Trident-1, 24 missiles per submarine.

Prior to FY 1987 funds totalling \$18 billion were allocated to the construction of 14 submarines of this class. The Department of Defense plans to procure 20 such submarines in all. The boats will be sited at naval bases at Kings Bay, Georgia and Bangor, Washington. Construction of the Kings Bay base will be completed by 1990 at a cost of \$1.4 billion. The Bangor naval base, at which eight nuclear SLBM-carrying submarines are already stationed, is currently nearing completion.

The Trident-2 SLBM has been under development since 1987. The first stage of development (1978-1980) entailed scientific research efforts to study alternative variants of the missile. About \$700 million has been allocated for its experimental development since 1981. Full scale development has been ongoing since 1984. At that time the Department of Defense budget allotted \$1.5 billion for this purpose (work began at the end of 1983). The chief contractor in this effort—as for the Trident-1 missile—was the Lockheed Corporation. In fiscal years 1985, 1986 and 1987, allocations of \$2.0, 2.1 and 1.6 billion respectively were made to continue full-scale missile development.

Preliminary estimates indicate that the total cost of development of the Trident-2 SLBM will come to \$10 billion. This amount includes construction of 30 experimental models of the missile for flight testing, scheduled to begin this year.

Financing for missile production has been continuing since 1985. The navy's FY 1987 budget allocated \$1.3 billion for the purchase of 21 missiles. In 1988 the rate of procurement of new SLBM's is planned to reach 66 missiles per year, for which \$2.3 billion has been requested. The program calls for the acquisition of 818 missiles in all.

Trident-2 SLBM deployment is scheduled to begin in 1989. The ninth Ohio-class submarine will be the first boat on which they are installed. The first eight submarines, originally outfitted with the Trident-1, will be re-outfitted with the new missile at the beginning of the 1990's. The cost of re-equipping one submarine has been roughly estimated at \$125 million (not including missile cost).

Thus, implementation of this multi-billion dollar program will enable the United States to completely rearm its nuclear submarine fleet with new ballistic missiles and substantially enhance the capabilities of the sea-based component of its strategic nuclear triad. Preliminary estimates indicate that the total cost of building the Trident missile system will reach \$70 billion.

The Tomahawk sea-launched cruise missile program. The re-arming of surface vessels and submarines with Tomahawk sea-launched cruise missiles occupies an important position in Pentagon plans. Currently being re-outfitted with these SLCM's are nuclear submarines of the Los Angeles and Sturgeon class, Iowa-class battleships, nuclear guided missile cruisers of the California and Virginia classes, Ticonderoga-class guided missile cruisers, and Spruance-class destroyers. Plans call for the installation of cruise missiles on more than 140 surface ships and submarines in all.

Development of the Tomahawk cruise missile began in 1973. Expenditures for scientific research and experimental design work from the beginning of development through the present time amount to about \$1.5 billion.

Tomahawk cruise missile procurement has been financed since 1980. Problems arising at the beginning of their production with respect to missile quality provided a basis for curtailment of planned purchases by the U.S. Congress. Thus, the FY 1983 defense budget provided for a decrease in the number of Tomahawk missiles from 120 (planned allocation of \$292.2 million) to 51 (appropriations were approved in the amount of \$207.5 million); the FY 1984 budget effected a reduction from 312 (\$600.0 million) to 124 (\$326.2 million) and the FY 1985 figures went from 353 (\$707.9 million) to 180 (\$551.3 million). Missile procurement quantities sanctioned by the Congress in subsequent years followed the recommendations of the Department of Defense. The draft budgets for FY 1988 and 1989 reflect requests of \$1 billion each for the acquisition of 475 and 310 sea-launched cruise missiles.

Tomahawk cruise missile production is being carried out at General Dynamics and McDonnell Douglas plants.

It is planned to spend a total of \$12.8 billion for the acquisition of 4068 missiles. About 760 of this number will carry nuclear warheads; the remainder will be assigned non-nuclear employment roles.

The SALT-2 agreement presents a serious obstacle to implementation of these expansive, militaristic programs with respect to the build-up in strategic offensive armament. Repudiation of SALT-2 and exceeding its prescribed limitations will lead to an expansion of the arms race and this is what the ringleaders of the U.S. military-industrial complex are counting on. The security of the United States, however, will not be enhanced by this. In increasing its mountains of armament, primarily its nuclear armament, the American leadership is creating a serious threat to the entire world, including the United States itself.

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9768

#### FY 1987 Budget and Force Build-Up of the Japanese Navy

18010041o Moscow ZARUBEZHNOYE VOYENNOYE OBOZRENIYE in Russian No 10, Oct 87 (signed to press 5 Oct 87) pp 69-71

[Article by Captain 1st Rank Yu. Yurin: "FY 1987 Budget and Force Build-Up of the Japanese Navy"]

[Text] Of Japan's 3.5174 trillion yen (about \$22 billion) overall military budget, 861.5 billion yen (24.4 percent) is being allocated to naval forces expenditures in FY 1987 (which begins 1 April). This represents an 8.1 percent increase over the preceding year. [Editor's note: For more details on the budget and build-up of the Japanese navy in FY 86, see ZARUBEZHNOYE VOYENNOYE OBOZRENIYE, 1986, No 8, pp 75-76]. The distribution of navy budget outlays for principal items is as shown in Table 1.

Payments of follow-on expenditures relating to contracts concluded earlier (437.3 billion yen) pursuant to plans for Japanese naval construction over FY 1983-1986 include shipbuilding expenditures (22 ships), aircraft construction (59 planes and helicopters), as well as purchases of weapons, combat equipment and materiel with distribution of payments as scheduled by the specific contract. In this regard, a portion of FY 1987 contracts provide for future outlays which will be included in the naval budget expenditures for FY 1988-1990. Payments pertaining to the remainder will be made in the current fiscal year. Naval weapons and equipment which will enter the inventory include: the SS581 Yukiseo submarine, DDG172 Simakaze and DD151 Asagiri guided missile destroyers, MSC666 and -667 mine-sweepers, LCU amphibious landing craft, ATS combat readiness support ship, eight auxiliary ships (YT-68 and -69, YW-17, YO-25 and -26, YG-203, YL-11 and YF-2124), eight P-3C Orion land-based patrol aircraft, U-36A electronic warfare and support aircraft, TC-90 training aircraft, 10 HSS-2B anti-submarine helicopters (3 shipborne), S-61A rescue helicopter. Thirteen ships remain under construction (seven Asagiri guided

Expenditure	Allocation (billions of yen)	Increase over FY 86 million yen (percent)
Personnel pay, wages	281.2	32.1 (+8.6)
Contract payments under earlier-concluded contracts	485.5	45.6 (11.6)
New contracts and their initial payment outlays	123.0	4.7 (4.0)
New contract allocations by type		
shipbuilding (and modernization)	2.2	8.2 (8.7)
aircraft construction (and modernization)	6.6	0.1 (24.2)
ammunition	2.0	0.4 (22.4)
PR	18.6	-10.4 (-39.0)
combat readiness	7.1	0.9 (14.5)
vehicles (and servicing)	6.1	0.7 (13.5)
repairs and spare parts	56.2	6.5 (13.2)
facilities construction	13.8	6.3 (50.0)
other	19.4	0 (0)
<b>TOTAL</b>	<b>861.8</b>	<b>68.2 (8.6)</b>

TABLE 1 FY87 Japanese Navy Budget Allocations

missile destroyers, two DE229 guided missile frigates, one Yushio-class and one SS583 submarine, two Hatsu-sima-class mine-sweepers) as well as 39 planes and helicopters (20 P-3C, 1 US-1A, 1 KM-2k, 13 HSS-2B, and 4 MH-53E). These items will enter the naval fleet inventory over the next three fiscal years.

New contracts, estimated at an overall worth of 608.5 billion yen, include both primary expenditures (123.0 billion) and follow-on, installment payments (485.5 billion) which will fall unavoidably into the naval budget expenditures for FY 1988-1990. The following special-purpose outlays are programmed in accordance with new contracts: shipbuilding (with modernization)—141.8 billion yen; aircraft construction (with modernization)—161.5 billion; ammunition procurement—39.8 billion; administrative support—142.4 billion.

The FY 1987 shipbuilding program includes new orders for the construction of 14 ships, with total displacement of 25,661 tons (in addition to those presently being built). Ship class and planned construction outlays are as shown in Table 2.

The FY 1987 naval aircraft construction program includes new orders providing for construction of 35 planes and helicopters (in addition to those presently under construction) at a total cost of 153,271 billion yen (Table 3).

It is planned to increase the prescribed naval force strength to 45,790 and maintain the personnel strength level at 96 percent. The number of civilian workers will be reduced to 4,113 and the permanent reserve staff level brought to 800.

Ship class, quantity, sequence in series	Displacement (tons)	Year completed (FY)	Total expenditures (billions yen) Initial (FY 87) Subsequent total
Guided missile frigates			
Second class, third, fourth	1900	1990	8.367 59.496 61.857
Submarine, SS583, second	2800	1990	8.157 39.841 39.998
Min-sweeper, Hatsu-sima class, 1, 200, first	675	1990	8.618 18.326 18.344
Supply ship, Tonda class, 1, second, third	8300	1990	8.087 39.182 39.269
Auxiliary ships, 7		1987-1998	8.302 1.250 1.452
Tugboat (T-76)	200	1990	
Litter boat (T-17)	210	1997	
Petroleum barge 2, (T-25, T-31)	690	1997	
Fueling vessel (T-293)	270	1997	
Lighter (T-11)	80	1997	
Passenger launch (T-2224)	11	1997	
<b>TOTAL</b>	<b>29,461</b>		<b>8.361 148.395 153.003</b>

TABLE 2 FY87 Shipbuilding Program for Japanese Navy

Aircraft/helicopter class, quantity, sequence in series	Year of completion (FY)	Total expenditures (billion yen)		
		Initial (FY 87)	Subsequent	Total
Land-based patrol aircraft P-3C, 9, first - 69th	1980	0	39.395	39.395
Electronic warfare aircraft D-3, first	1990	0	12.430	12.430
EW and combat training aircraft U-38A, third	1989	0.047	2.770	2.817
Training aircraft EH-2K, 2, second, third	1988	0.042	0.650	0.792
Liaison aircraft LC-90, first	1988	0.050	0.474	0.524
Skip-based ASW helicopters HSS-2B, 9, first - 49th (last)	1989	0.230	37.815	37.845
Ship-based ASW helicopters HSS-2B, 8, 28th - 35th (last)	1989	0.230	37.815	37.845
Mine-sweeper helicopters MH-65E, 2, fifth, sixth	1980	0.070	0.105	0.175
Training helicopters OH-6D, 2, sixth, seventh	1988	0	0.465	0.465
TOTAL		0.450	152.821	153.271

TABLE 3 FY87 Aircraft Construction Program for Japanese Navy

As new ships enter the inventory it is planned to integrate the 63d Guided Missile Destroyer (Amatsukadze and Simakadze) Division into the 3d Flotilla (Maidzuru Naval Station), the 19th Mine-Sweeper Division (two new Hatsushima-class ships) into the 1st Flotilla (Kure Naval Station), the 22d Air Wing (headquarters, 122d and 123d air squadrons, 22d Aviation Engineering Support Group, Airfield Technical Support Group) at Omura Air Base, the 206th Training Squadron into the Simosa Training Wing. It is planned to break up the 43d Separate Mine-Sweeper Division (based at Simonoseki, Sasebo Naval District) and the Kanoya training air wing. The 211th Helicopter Training Air Squadron, a component of the Kanoya wing, will be subordinated to the headquarters of the navy's air training command. It is also planned to transfer one mine-sweeper division of the 1st Flotilla to the Sasebo Naval District (Simonoseki) and the 122d Air Squadron of the 21st Air Wing to the 22d Air Wing. In addition, organizational changes are proposed in the structure of the naval stations, depot ships and harbor services of the naval districts so as to delineate naval administrative support functions more precisely. Ships, launches, planes and helicopters will continue to be transferred to the reserve as they become obsolete.

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9768

Bundeswehr Pipeline Battalion  
1801004/p Moscow ZARUBEZHNOYE VOYENNOYE  
OBOZRENIYE in Russian No 10, Oct 87 (signed to  
press 5 Oct 87) pp 72-74

[Article by Reserve Colonel Yu. Korolev, candidate of  
military sciences: "Bundeswehr Pipeline Battalion"]

[Text] With respect to measures taken to develop the NATO infrastructure, great significance is attached to creating a diversified network of military and civilian pipelines in the theater of military operations as the most efficient means of supplying the armed forces with petroleum products.

Efforts to construct a system of major NATO pipelines in the Central European theater of operations were basically completed at the end of the 1960's. Later on, as the strength of NATO's armed forces grew and the breadth of its military equipment expanded, fuel supply requirements increased. The pipeline system has therefore been undergoing constant development and improvement. Specifically, pipe diameter has been increased, especially at the initial segments leading out from fuel unloading points; second and third runs of pipeline have been laid. As a result, a diversified pipeline network has now been established in the theater of operations along with major pipeline facilities—pumping stations, fuel storage depots and refueling stations—located over the territory of France, Belgium, the Netherlands, Luxembourg and West Germany.

An agency has been established for pipeline operation in the Central European theater to insure coordinated activity of the system. Subordinate to it are seven regional directorates: three in France, two in West Germany, one in Belgium, and one in the Netherlands. These directorates are tasked with providing flexibility and stability to the operation of the pipeline system in their regions. Responsibility for pipeline maintenance and repair is entrusted to pipeline units of the national armed forces.

Insofar as over half the military pipeline of the Central European theater is located on West German territory (and includes 28 NATO POL depots with total capacity

readiness, specialized training and various means of support; noncommissioned officers and soldiers. The headquarters and supply company is tasked with organizing the communications and medical care of the battalion, and providing it all types of subsistence. Unlike similar companies of other engineer units, it has more diversified communications systems, to include teletype communications. The operations and pipeline companies have sets of equipment used for laying field pipeline networks and erecting fuel storage depots, excavating equipment, load lifters, and materiel transport equipment. The battalion also has fire extinguishing equipment.

In all, the pipeline battalion has (wartime TOE level) 60 Deitz bulldozers, 3 graders, 3 excavators, 3 cranes, about 30 inflatable boats, about 800 small arms weapons, more than 130 radios, various vehicles.

The battalion has no pipeline equipment (pumps, valves, slide valves, piping, reservoirs) in peacetime for replacement of fixed pipeline components. These are stored in warehouses located along the NATO pipelines, a fact related to the basic usage principle for the equipment: upon instructions from the appropriate territorial command, materiel is taken from the nearest warehouse and used to replace the damaged pipeline segment or pipeline network facility. There is a limited quantity of pipeline equipment in the battalion which is used only for training during peacetime.

Procedures for employment of the pipeline battalion depend on the technical condition of the entire main pipeline system in the Central European theater and on the tasks to be accomplished.

It is stated in the foreign press that when several instances of damage arise simultaneously, the territorial command first identifies those which may cause the greatest disruption to system operation, then establishes an order of priority for their repair. This effort is guided by the following principle: no matter where or how extensive the damage is to the system, it must be restored in three days. This time standard is to be observed regardless of how the problem is resolved—through repair, by-pass equipment, emplacement of emergency refuelling points, or connection to another pipeline network. Bundeswehr combat engineers believe that, under time constraints, the individual aspects of the restoration effort, e.g., reconnaissance, planning, transportation of materials and construction, should be accomplished simultaneously as much as possible. Of course, this can be very difficult in practice when there is a significant amount of work to be done, adverse external conditions and imperfect organization. A certain amount of time can also be saved by preparing the necessary technical paperwork in peacetime for effecting restoration at those areas where damage is most likely to occur.

The rate at which restoration work is performed is affected significantly by the time of day. Efforts are made to get this work done during the daytime only, since good illumination is necessary to insure quality in the joints and connections. Additional lighting is required at night, which naturally runs counter to the requirements for camouflage.

According to West German press reports, the pipeline restoration effort in wartime may entail certain difficulties. Some of these are due to the large territorial expanse which must be serviced. Reliable communications using TOE communications equipment can not be provided with all sectors of the pipeline network. It will therefore be necessary to use the stationary lines of communication, which will make control of unit activities more vulnerable. Providing them material supplies also becomes more complex. Certain problems also arise due to the fact that it is practically impossible to foresee in timely fashion where and to what extent damage will occur. This makes it necessary for unit personnel to have a good working knowledge of the physical-geographical terrain features and the technical parameters of the pipeline itself over the entire region.

The ability of battalion units to defend themselves becomes a complex matter. The Bundeswehr command believes that enemy commando teams may already be active during a period of tension, when the main contingent of pipeline unit personnel, as well as companies of the territorial defense forces, will not yet have been mobilized.

Pipeline system operation can be restored through the use of pipeline bypass equipment, including wells with slide valves, through the repair of other pipeline network facilities, or through replacement of components from sets of field equipment. Bundeswehr engineers believe that, in pipeline restoration, first efforts should be directed towards the use of equipment to bypass damaged facilities, using sets of field pipe for this purpose. They also feel, however, that bypassing damaged segments has one significant disadvantage: in many cases it is necessary to connect extended lengths of additional pipeline, requiring significant time, effort and personnel, since the wells which must be connected are often situated more than 20 km apart.

The pipeline battalion can prepare emergency supply points. Using field pipe sets and special wells with slide valves at the stationary pipeline, battalion personnel can erect the necessary facilities, primarily reserve fuel storage facilities and their servicing stations for vehicular and railroad fuel tanks.

Recent military press reports have provided justification for the need to enhance the capabilities of those units which support pipeline operation and maintain fuel storage depots. This would include outfitting them with more efficient equipment. New, special-purpose equipment sets, for example, are expected to arrive soon in the

pipeline battalions which will facilitate direct connection with the main military pipelines. The Bundeswehr command feels that this will increase their capabilities with regard to restoring pipeline systems operation.

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9768

**British Ground Forces Mobile Task Force**  
*18010041q Moscow ZARUBEZHNOYE VOYENNOYE OBOZRENIYE in Russian No 10, Oct 87 (signed to press 5 Oct 87) p 75*

[Article by Colonel S. Anzherskiy: "British Ground Forces Mobile Task Force"]

[Text] Foreign military press reports relate that, when a state of emergency arises in Europe, the leadership of Great Britain's armed forces intends to assign a so-called mobile task force, operationally subordinate to the NATO combined military forces command in the Baltic Straits Zone. Task force composition will include the 1st Separate Motorized Rifle Brigade, a special administrative support group, and helicopter detachment (14-15 thousand men, of which 5,000 will be reservists).

The 1st Separate Motorized Rifle Brigade (stationed at Tidworth, 75 km northwest of Portmouth) includes a headquarters, three motorized rifle battalions, artillery, reconnaissance and engineer regiments, tank company, helicopter squadron, six combat and administrative support companies (signal, transportation, repair and servicing, medical, technical services/logistics support, military police). Its armament consists of 14 Chieftain tanks, 16 Scorpion light tanks, 18 FH-70 155-mm towed howitzers, 24 81-mm mortars, 18 Milan ATGM launchers, and 12 helicopters (6 with TOW ATGM). The brigade can be reinforced with two-three territorial forces battalions, two 105-mm artillery batteries (12 guns), a Rapier air defense battery (12 firing units) and units of other branches and services. Its total personnel strength is 8-9 thousand men.

The special administrative support group will be set up using administrative/rear services units of the territorial forces. It consists of transportation and engineer regiments, technical services and logistics support battalion, repair and refitting battalion, traffic control and port support companies, field and stationary hospitals, and a number of other service and support units. Its total strength comes to 4500 men.

The helicopter detachment is organized from air force assets and includes 10 Puma helicopters and 5 Chinook assault transport helicopters.

Judging from NATO combined forces exercises (Bold Guard) conducted in the Baltic Straits Zone since 1983, the most likely areas of operational deployment of the

mobile task force are the Jutland Peninsula, Sjaelland Island (Denmark) and the Schleswig-Holstein area (FRG). The task force can be transported by sea and operationally deployed in the straits zone in seven days. In order to work out matters of coordination and interaction with Danish and West German troops, and to become thoroughly familiar with the area of operations, the mobile task force conducts troop exercises once every four years in one of the designated regions. Exercises scheduled for 1988 will take place on Sjaelland Island.

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**American Underwater Signals Source**  
*18010041r Moscow ZARUBEZHNOYE VOYENNOYE OBOZRENIYE in Russian No 10, Oct 87 (signed to press 5 Oct 87) p 78*

[Article by Captain 1st Rank A. Prostakov: "American Underwater Signals Source"]

[Text] The Mk84 (mod 1) underwater signals source is a one-time-use device developed by the U.S. firm Sippican for transmitting signals to deeply submerged submarines. Widely used by U.S. naval forces, the Mk84 (mod 1) can be employed from both aircraft and surface vessels. According to foreign press reports, the naval forces of Great Britain, Canada, Australia and Greece have already purchased underwater signals sources of this type. The French and Japanese navies are also expected to acquire it. Overall output of these devices reaches 10,000 per year.

The Mk84 (mod 1) is configured as a bomble: 38.1 cm long, 7.62 cm in diameter, and 2.95 kg in mass with plastic tailfin assembly. It can be dropped from aircraft (from altitudes of up to 3000 m and speeds of up to 700 km/hr) and helicopters. The Mk84 (mod 1) differs from its predecessor, the Mk84 (mod 0), primarily by virtue of the fact that the pyrotechnic cartridge used to restrict the possibility of creating various signals combinations, has been replaced by an electro-acoustic one enabling the study of various coded signals.

As the underwater signals source strikes the water, its electro-accumulator is activated and emits, during a time interval of 45-128 seconds (submergence velocity of the device is 4.4 m/sec), a coded combination of two impulses, 0.5 or 1.5 seconds in duration, and 3.5 or 2.95 kHz in frequency. Here there are five possible variations: four by virtue of impulse combinations (1 and 1; 1 and 2; 2 and 1; 2 and 2), the fifth using audio emission at the 3.5 kHz frequency. Any meaning may be associated with the coded combinations. The following might constitute typical meanings: 1—remain submerged; 2—surface for identification; 3—establish communications at the first suitable opportunity; 4—exercise is beginning; 5—exercise has concluded.

The Mk84 (mod 1) underwater signals source is also being used in combat training to simulate use of anti-submarine weapons.

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18010041s Moscow ZARUBEZHNOYE VOYENNOYE OBOZRENIYE in Russian No 10, Oct 87 (signed to press 5 Oct 87)

[Text]

New Small Arms Manufactured by the Beretta Italian Firm (Reserve Lieutenant Colonel A. Chekulayev, candidate of technical sciences) (pp 31-32)

Construction of MEKO-200 Guided Missile Frigates for the Portuguese Navy (Major V. Surkov) (p 61)

Test Your Knowledge: British Warships (unattributed) (p 62)

British Arms Exports (Captain 2d Rank Yu. Illov) (p 75)

The British Mk2 "Süpocket" Carrier Vehicle (Lieutenant Colonel V. Nesterenko) (p 76)

The Honduran Air Force (Colonel L. Konstantinov) (pp 76-77)

French P-400 Patrol Cutters (Captain 2d Rank V. Oksanin) (p 77)

Foreign Military News Items (unattributed) (pp 79-80)

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